**OM-219 316A**

February 2004

**Processes**

MIG (GMAW) Welding

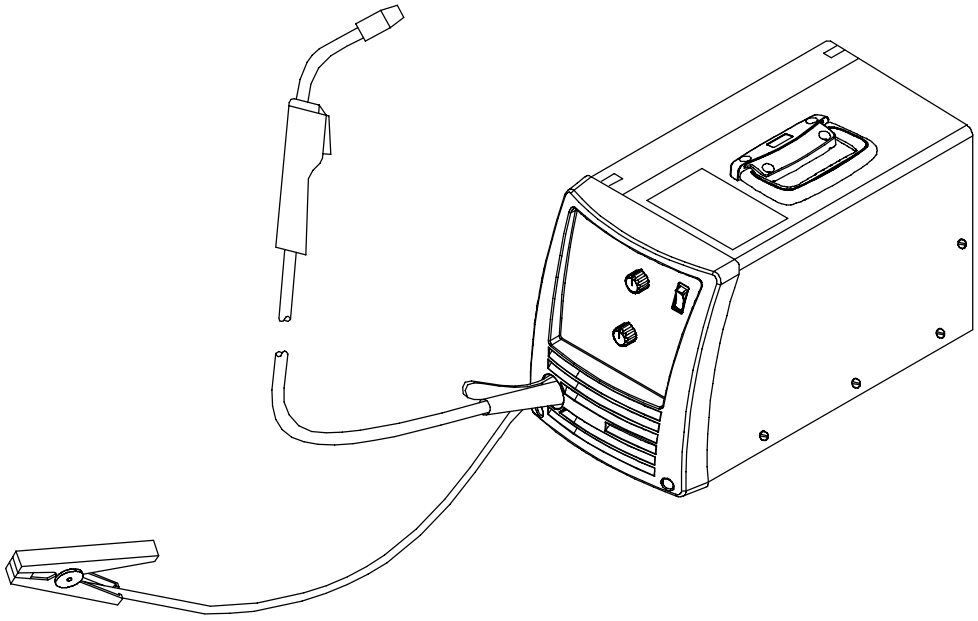
Flux Cored (FCAW) Welding

**Description**

CV DC 1 Phase

Arc Welding Power Source And Wire Feeder

# MW 140 Plus / 180 Plus And M-10 Gun



**For Warranty Claims And Technical Support, Contact:**
**Milweld Inc., National Distributor**
**P.O. Box 338, Hortonville, WI 54944-0338**
**Tel 920-779-0916 Fax 920-779-0924**

# OWNER'S MANUAL

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# SECTION 1 − SAFETY PRECAUTIONS - READ BEFORE USING

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## 1-1. Symbol Usage

Means Warning! Watch Out! There are possible hazards with this procedure! The possible hazards are shown in the adjoining symbols.

▲ **Marks a special safety message.**

☞ *Means "Note"; not safety related.*

This group of symbols means Warning! Watch Out! possible ELECTRIC SHOCK, MOVING PARTS, and HOT PARTS hazards. Consult symbols and related instructions below for necessary actions to avoid the hazards.

## 1-2. Arc Welding Hazards

▲ **The symbols shown below are used throughout this manual to call attention to and identify possible hazards. When you see the symbol, watch out, and follow the related instructions to avoid the hazard. The safety information given below is only a summary of the more complete safety information found in the Safety Standards listed in Section 1-5. Read and follow all Safety Standards.**

▲ **Only qualified persons should install, operate, maintain, and repair this unit.**

▲ **During operation, keep everybody, especially children, away.**

### ELECTRIC SHOCK can kill.

Touching live electrical parts can cause fatal shocks or severe burns. The electrode and work circuit is electrically live whenever the output is on. The input power circuit and machine internal circuits are also live when power is on. In semiautomatic or automatic wire welding, the wire, wire reel, drive roll housing, and all metal parts touching the welding wire are electrically live. Incorrectly installed or improperly grounded equipment is a hazard.

- Do not touch live electrical parts.
- Wear dry, hole-free insulating gloves and body protection.
- Insulate yourself from work and ground using dry insulating mats or covers big enough to prevent any physical contact with the work or ground.
- Do not use AC output in damp areas, if movement is confined, or if there is a danger of falling.
- Use AC output ONLY if required for the welding process.
- If AC output is required, use remote output control if present on unit.
- Disconnect input power or stop engine before installing or servicing this equipment. Lockout/tagout input power according to OSHA 29 CFR 1910.147 (see Safety Standards).
- Properly install and ground this equipment according to its Owner's Manual and national, state, and local codes.
- Always verify the supply ground − check and be sure that input power cord ground wire is properly connected to ground terminal in disconnect box or that cord plug is connected to a properly grounded receptacle outlet.
- When making input connections, attach proper grounding conductor first − double-check connections.
- Frequently inspect input power cord for damage or bare wiring − replace cord immediately if damaged − bare wiring can kill.
- Turn off all equipment when not in use.
- Do not use worn, damaged, undersized, or poorly spliced cables.
- Do not drape cables over your body.
- If earth grounding of the workpiece is required, ground it directly with a separate cable.
- Do not touch electrode if you are in contact with the work, ground, or another electrode from a different machine.
- Use only well-maintained equipment. Repair or replace damaged parts at once. Maintain unit according to manual.
- Wear a safety harness if working above floor level.
- Keep all panels and covers securely in place.
- Clamp work cable with good metal-to-metal contact to workpiece or worktable as near the weld as practical.
- Insulate work clamp when not connected to workpiece to prevent contact with any metal object.
- Do not connect more than one electrode or work cable to any single weld output terminal.

### SIGNIFICANT DC VOLTAGE exists after removal of input power on inverters.

- Turn Off inverter, disconnect input power, and discharge input capacitors according to instructions in Maintenance Section before touching any parts.

### FUMES AND GASES can be hazardous.

Welding produces fumes and gases. Breathing these fumes and gases can be hazardous to your health.

- Keep your head out of the fumes. Do not breathe the fumes.
- If inside, ventilate the area and/or use exhaust at the arc to remove welding fumes and gases.
- If ventilation is poor, use an approved air-supplied respirator.
- Read the Material Safety Data Sheets (MSDSs) and the manufacturer's instructions for metals, consumables, coatings, cleaners, and degreasers.
- Work in a confined space only if it is well ventilated, or while wearing an air-supplied respirator. Always have a trained watch-person nearby. Welding fumes and gases can displace air and lower the oxygen level causing injury or death. Be sure the breathing air is safe.
- Do not weld in locations near degreasing, cleaning, or spraying operations. The heat and rays of the arc can react with vapors to form highly toxic and irritating gases.
- Do not weld on coated metals, such as galvanized, lead, or cadmium plated steel, unless the coating is removed from the weld area, the area is well ventilated, and if necessary, while wearing an air-supplied respirator. The coatings and any metals containing these elements can give off toxic fumes if welded.

## ARC RAYS can burn eyes and skin.

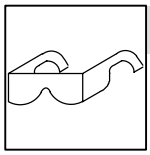
Arc rays from the welding process produce intense visible and invisible (ultraviolet and infrared) rays that can burn eyes and skin. Sparks fly off from the weld.

- Wear a welding helmet fitted with a proper shade of filter to protect your face and eyes when welding or watching (see ANSI Z49.1 and Z87.1 listed in Safety Standards).
- Wear approved safety glasses with side shields under your helmet.
- Use protective screens or barriers to protect others from flash and glare; warn others not to watch the arc.
- Wear protective clothing made from durable, flame-resistant material (leather and wool) and foot protection.

## WELDING can cause fire or explosion.

Welding on closed containers, such as tanks, drums, or pipes, can cause them to blow up. Sparks can fly off from the welding arc. The flying sparks, hot workpiece, and hot equipment can cause fires and burns. Accidental contact of electrode to metal objects can cause sparks, explosion, overheating, or fire. Check and be sure the area is safe before doing any welding.

- Protect yourself and others from flying sparks and hot metal.
- Do not weld where flying sparks can strike flammable material.
- Remove all flammables within 35 ft (10.7 m) of the welding arc. If this is not possible, tightly cover them with approved covers.
- Be alert that welding sparks and hot materials from welding can easily go through small cracks and openings to adjacent areas.
- Watch for fire, and keep a fire extinguisher nearby.
- Be aware that welding on a ceiling, floor, bulkhead, or partition can cause fire on the hidden side.
- Do not weld on closed containers such as tanks, drums, or pipes, unless they are properly prepared according to AWS F4.1 (see Safety Standards).
- Connect work cable to the work as close to the welding area as practical to prevent welding current from traveling long, possibly unknown paths and causing electric shock and fire hazards.
- Do not use welder to thaw frozen pipes.
- Remove stick electrode from holder or cut off welding wire at contact tip when not in use.
- Wear oil-free protective garments such as leather gloves, heavy shirt, cuffless trousers, high shoes, and a cap.
- Remove any combustibles, such as a butane lighter or matches, from your person before doing any welding.



## FLYING METAL can injure eyes.

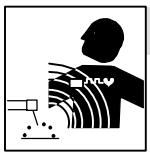
- Welding, chipping, wire brushing, and grinding cause sparks and flying metal. As welds cool, they can throw off slag.
- Wear approved safety glasses with side shields even under your welding helmet.

## BUILDUP OF GAS can injure or kill.

- Shut off shielding gas supply when not in use.
- Always ventilate confined spaces or use approved air-supplied respirator.

## HOT PARTS can cause severe burns.

- Do not touch hot parts bare handed.
- Allow cooling period before working on gun or torch.



## MAGNETIC FIELDS can affect pacemakers.

- Pacemaker wearers keep away.
- Wearers should consult their doctor before going near arc welding, gouging, or spot welding operations.

## NOISE can damage hearing.

Noise from some processes or equipment can damage hearing.

- Wear approved ear protection if noise level is high.

## CYLINDERS can explode if damaged.

Shielding gas cylinders contain gas under high pressure. If damaged, a cylinder can explode. Since gas cylinders are normally part of the welding process, be sure to treat them carefully.

- Protect compressed gas cylinders from excessive heat, mechanical shocks, slag, open flames, sparks, and arcs.
- Install cylinders in an upright position by securing to a stationary support or cylinder rack to prevent falling or tipping.
- Keep cylinders away from any welding or other electrical circuits.
- Never drape a welding torch over a gas cylinder.
- Never allow a welding electrode to touch any cylinder.
- Never weld on a pressurized cylinder − explosion will result.
- Use only correct shielding gas cylinders, regulators, hoses, and fittings designed for the specific application; maintain them and associated parts in good condition.
- Turn face away from valve outlet when opening cylinder valve.
- Keep protective cap in place over valve except when cylinder is in use or connected for use.
- Read and follow instructions on compressed gas cylinders, associated equipment, and CGA publication P-1 listed in Safety Standards.

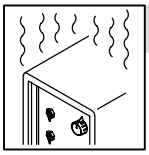
## 1-3. Additional Symbols For Installation, Operation, And Maintenance

### FIRE OR EXPLOSION hazard.

- Do not install or place unit on, over, or near combustible surfaces.
- Do not install unit near flammables.
- Do not overload building wiring − be sure power supply system is properly sized, rated, and protected to handle this unit.

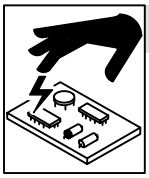
### FALLING UNIT can cause injury.

- Use lifting eye to lift unit only, NOT running gear, gas cylinders, or any other accessories.
- Use equipment of adequate capacity to lift and support unit.
- If using lift forks to move unit, be sure forks are long enough to extend beyond opposite side of unit.



### OVERUSE can cause OVERHEATING

- Allow cooling period; follow rated duty cycle.
- Reduce current or reduce duty cycle before starting to weld again.
- Do not block or filter airflow to unit.



### STATIC (ESD) can damage PC boards.

- Put on grounded wrist strap BEFORE handling boards or parts.
- Use proper static-proof bags and boxes to store, move, or ship PC boards.

### MOVING PARTS can cause injury.

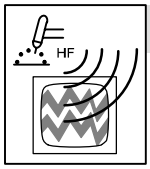
- Keep away from moving parts.
- Keep away from pinch points such as drive rolls.

### WELDING WIRE can cause injury.

- Do not press gun trigger until instructed to do so.
- Do not point gun toward any part of the body, other people, or any metal when threading welding wire.

### MOVING PARTS can cause injury.

- Keep away from moving parts such as fans.
- Keep all doors, panels, covers, and guards closed and securely in place.




### H.F. RADIATION can cause interference.

- High-frequency (H.F.) can interfere with radio navigation, safety services, computers, and communications equipment.
- Have only qualified persons familiar with electronic equipment perform this installation.
- The user is responsible for having a qualified electrician promptly correct any interference problem resulting from the installation.
- If notified by the FCC about interference, stop using the equipment at once.
- Have the installation regularly checked and maintained.
- Keep high-frequency source doors and panels tightly shut, keep spark gaps at correct setting, and use grounding and shielding to minimize the possibility of interference.

### ARC WELDING can cause interference.

- Electromagnetic energy can interfere with sensitive electronic equipment such as computers and computer-driven equipment such as robots.
- Be sure all equipment in the welding area is electromagnetically compatible.
- To reduce possible interference, keep weld cables as short as possible, close together, and down low, such as on the floor.
- Locate welding operation 100 meters from any sensitive electronic equipment.
- Be sure this welding machine is installed and grounded according to this manual.
- If interference still occurs, the user must take extra measures such as moving the welding machine, using shielded cables, using line filters, or shielding the work area.

## 1-4. California Proposition 65 Warnings

▲ **Welding or cutting equipment produces fumes or gases which contain chemicals known to the State of California to cause birth defects and, in some cases, cancer. (California Health & Safety Code Section 25249.5 et seq.)**

▲ **Battery posts, terminals and related accessories contain lead and lead compounds, chemicals known to the State of California to cause cancer and birth defects or other reproductive harm. Wash hands after handling.**

**For Gasoline Engines:**

▲ **Engine exhaust contains chemicals known to the State of California to cause cancer, birth defects, or other reproductive harm.**

**For Diesel Engines:**

▲ **Diesel engine exhaust and some of its constituents are known to the State of California to cause cancer, birth defects, and other reproductive harm.**

## 1-5. Principal Safety Standards

*Safety in Welding, Cutting, and Allied Processes,* ANSI Standard Z49.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (phone: 305-443-9353, website: www.aws.org).

*Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping*, American Welding Society Standard AWS F4.1, from American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (phone: 305-443-9353, website: www.aws.org).

*National Electrical Code*, NFPA Standard 70, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101(phone: 617−770−3000, website: www.nfpa.org and www.sparky.org).

*Safe Handling of Compressed Gases in Cylinders*, CGA Pamphlet P-1, from Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202−4102 (phone: 703−412−0900, website: www.cganet.com).

*Code for Safety in Welding and Cutting*, CSA Standard W117.2, from Canadian Standards Association, Standards Sales, 178 Rexdale Boulevard, Rexdale, Ontario, Canada M9W 1R3 (phone: 800−463−6727 or in Toronto 416−747−4044, website: www.csa−international.org).

*Practice For Occupational And Educational Eye And Face Protection,* ANSI Standard Z87.1, from American National Standards Institute, 11 West 42nd Street, New York, NY 10036−8002 (phone: 212−642−4900, website: www.ansi.org).

*Standard for Fire Prevention During Welding, Cutting, and Other Hot Work*, NFPA Standard 51B, from National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101 (phone: 617−770−3000,website: www.nfpa.org and www. sparky.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, from U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (there are 10 Regional Offices−−phone for Region 5, Chicago, is 312−353−2220,website: www.osha.gov).

## 1-6. EMF Information

Considerations About Welding And The Effects Of Low Frequency Electric And Magnetic Fields

Welding current, as it flows through welding cables, will cause electromagnetic fields. There has been and still is some concern about such fields. However, after examining more than 500 studies spanning 17 years of research, a special blue ribbon committee of the National Research Council concluded that: “The body of evidence, in the committee's judgment, has not demonstrated that exposure to power-frequency electric and magnetic fields is a human-health hazard.” However, studies are still going forth and evidence continues to be examined. Until the final conclusions of the research are reached, you may wish to minimize your exposure to electromagnetic fields when welding or cutting.

To reduce magnetic fields in the workplace, use the following procedures:

1. Keep cables close together by twisting or taping them.
2. Arrange cables to one side and away from the operator.
3. Do not coil or drape cables around your body.
4. Keep welding power source and cables as far away from operator as practical.
5. Connect work clamp to workpiece as close to the weld as possible.

**About Pacemakers:**

Pacemaker wearers consult your doctor first. If cleared by your doctor, then following the above procedures is recommended.

# SECTION 2 − CONSIGNES DE SÉCURITÉ − À LIRE AVANT UTILISATION



## 2-1. Signification des symboles

Signifie « Mise en garde. Faire preuve de vigilance. » Cette procédure présente des risques identifiés par les symboles adjacents aux directives.

▲ **Identifie un message de sécurité particulier.**

☞ *Signifie « NOTA » ; n'est pas relatif à la sécurité.*

Ce groupe de symboles signifie « Mise en garde. Faire preuve de vigilance. » Il y a des dangers liés aux CHOCS ÉLECTRIQUES, aux PIÈCES EN MOUVEMENT et aux PIÈCES CHAUDES. Se reporter aux symboles et aux directives ci-dessous afin de connaître les mesures à prendre pour éviter tout danger.

## 2-2. Dangers relatifs au soudage à l'arc

▲ **Les symboles ci-après sont utilisés tout au long du présent manuel pour attirer l'attention sur les dangers potentiels et les identifier. Lorsqu'on voit un symbole, faire preuve de vigilance et suivre les directives mentionnées afin d'éviter tout danger. Les consignes de sécurité énoncées ci-après ne font que résumer le contenu des normes de sécurité mentionnées à la section 2-4. Lire et respecter toutes ces normes.**

▲ **L'installation, l'utilisation, l'entretien et les réparations ne doivent être confiés qu'à des personnes qualifiées.**

▲ **Pendant l'utilisation de l'appareil, tenir à l'écart toute personne, en particulier les enfants.**

### LES DÉCHARGES ÉLECTRIQUES peuvent être mortelles.

Un simple contact avec des pièces sous tension peut causer une électrocution ou des blessures graves. L'électrode et le circuit de soudage sont sous tension dès que l'appareil est en fonctionnement. Le circuit d'entrée et les circuits internes de l'appareil sont également sous tension. En soudage semi−automatique ou automatique, le fil, le dévidoir, le logement des galets d'entraînement et les pièces métalliques en contact avec le fil de soudage sont sous tension. Tout matériel mal installé ou mal mis à la terre présente un danger.

- Ne jamais toucher aux pièces électriques sous tension.
- Porter des gants et des vêtements de protection secs et exempts de trous.
- S'isoler de la pièce et de la terre au moyen de tapis ou autres dispositifs isolants suffisamment grands pour empêcher tout contact physique avec la pièce ou la terre.
- Ne pas se servir d'une source de courant alternatif dans les zones humides, les endroits confinés ou là où on risque de tomber.
- Ne se servir d'une source de courant alternatif QUE si le procédé de soudage l'exige.
- Si l'utilisation d'une source de courant alternatif s'avère nécessaire, se servir de la fonction de télécommande si l'appareil en est équipé.
- Couper l'alimentation ou arrêter le moteur avant de procéder à l'installation, à la réparation ou à l'entretien de l'appareil. Couper/étiqueter l'alimentation selon la norme OSHA 29 CFR 1910.147 (voir les normes de sécurité).
- Installer et mettre à la terre correctement l'appareil conformément à son manuel d'utilisation et aux codes nationaux, provinciaux et municipaux.
- Toujours vérifier la terre du cordon d'alimentation − Vérifier et s'assurer que le fil de terre du cordon d'alimentation est bien raccordé à la borne de terre du sectionneur ou que la fiche du cordon est raccordée à une prise correctement mise à la terre.
- Pour exécuter les branchements d'entrée, fixer d'abord le conducteur de mise à la terre adéquat et contre−vérifier les connexions.
- Vérifier fréquemment le cordon d'alimentation et s'assurer qu'il n'est ni endommagé ni dénudé ; le remplacer immédiatement s'il est endommagé − tout câble dénudé peut causer une électrocution.
- Mettre l'appareil hors tension quand on ne l'utilise pas.
- Ne pas utiliser de câbles usés, endommagés, de calibre insuffisant ou mal épissés.
- Ne pas s'enrouler les câbles autour du corps.
- Si la pièce soudée doit être mise à la terre, le faire directement avec un câble distinct.
- Ne pas toucher l'électrode quand on est en contact avec la pièce, la terre ou une électrode d'une autre machine.
- N'utiliser que du matériel en bon état. Réparer ou remplacer sur−le−champ les pièces endommagées. Entretenir l'appareil conformément au présent manuel.
- Porter un harnais de sécurité quand on travaille en hauteur.
- Maintenir solidement en place tous les panneaux et capots.
- Fixer le câble de retour de façon à obtenir un bon contact métal sur métal avec la pièce à souder ou la table de travail, le plus près possible de la soudure.
- Ne pas connecter plus d'une électrode ou plus d'un câble de masse à un même terminal de sortie.

### Il subsiste un COURANT CONTINU IMPORTANT dans les convertisseurs après la suppression de l'alimentation électrique.

- Arrêter les convertisseurs, débrancher le courant électrique et décharger les condensateurs d'alimentation selon les instructions énoncées à la section Entretien avant de toucher les pièces.

### LES FUMÉES ET LES GAZ peuvent être dangereux.

Le soudage génère des fumées et des gaz dont l'inhalation peut être dangereuse pour la santé.

- Se tenir à distance des fumées et ne pas les inhaler.
- À l'intérieur, ventiler la zone et/ou utiliser un dispositif d'aspiration au niveau de l'arc pour l'évacuation des fumées et des gaz de soudage.
- Si la ventilation est insuffisante, utiliser un respirateur à adduction d'air agréé.
- Lire les fiches techniques de santé−sécurité (FTSS) et les instructions du fabricant concernant les métaux, les consommables, les revêtements, les nettoyants et les dégraisseurs.
- Ne travailler dans un espace clos que s'il est bien ventilé ou porter un respirateur à adduction d'air. Demander toujours à un surveillant dûment formé de se tenir à proximité. Des fumées et des gaz de soudage peuvent se substituer à l'air, abaisser la teneur en oxygène et causer des lésions ou des accidents mortels. S'assurer que l'air est respirable.
- Ne pas souder à proximité d'opérations de dégraissage, de nettoyage ou de pulvérisation. La chaleur et les rayons de l'arc peuvent réagir en présence de vapeurs et former des gaz hautement toxiques et irritants.
- Ne pas souder de métaux munis d'un revêtement, tels que la tôle d'acier galvanisée, plombée ou cadmiée, à moins que le revêtement n'ait été enlevé dans la zone de soudage, que l'endroit soit bien ventilé, et si nécessaire, porter un respirateur à adduction d'air. Les revêtements et tous les métaux renfermant ces éléments peuvent dégager des fumées toxiques lorsqu'on les soude.

## LES RAYONS DE L'ARC peuvent causer des brûlures oculaires et cutanées.

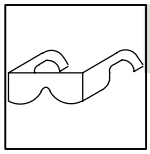
Le rayonnement de l'arc génère des rayons visibles et invisibles intenses (ultraviolets et infrarouges) susceptibles de causer des brûlures oculaires et cutanées. Des étincelles sont projetées pendant le soudage.

- Porter un masque de soudage muni d'un filtre de la nuance adéquate pour se protéger le visage et les yeux pendant le soudage ou pour regarder (voir les normes de sécurité ANSI Z49.1 et Z87.1).
- Porter des lunettes de sécurité à écrans latéraux sous le masque.
- Utiliser des écrans ou des barrières pour protéger les tiers de l'éclat éblouissant ou aveuglant de l'arc ; leur demander de ne pas regarder l'arc.
- Porter des vêtements de protection en matière durable et ignifuge (cuir ou laine) et des chaussures de sécurité.

## LE SOUDAGE peut causer un incendie ou une explosion.

Le soudage effectué sur des récipients fermés tels que des réservoirs, des fûts ou des conduites peut causer leur éclatement. Des étincelles peuvent être projetées de l'arc de soudure. La projection d'étincelles, les pièces chaudes et les équipements chauds peuvent causer des incendies et des brûlures. Le contact accidentel de l'électrode avec tout objet métallique peut causer des étincelles, une explosion, un surchauffement ou un incendie. Avant de commencer le soudage, vérifier et s'assurer que l'endroit ne présente pas de danger.

- Se protéger et protéger les tiers de la projection d'étincelles et de métal chaud.
- Ne pas souder à un endroit où des étincelles peuvent tomber sur des substances inflammables.
- Placer toutes les substances inflammables à une distance de 10,7 m de l'arc de soudage. En cas d'impossibilité, les recouvrir soigneusement avec des protections agréées.
- Des étincelles et des matières en fusion peuvent facilement passer même par des fissures et des ouvertures de petites dimensions.
- Surveiller tout déclenchement d'incendie et tenir un extincteur à proximité.
- Le soudage effectué sur un plafond, un plancher, une paroi ou une cloison peut déclencher un incendie de l'autre côté.
- Ne pas souder des récipients fermés tels que des réservoirs, des fûts ou des conduites, à moins qu'ils n'aient été préparés conformément à l'AWS F4.1 (voir les normes de sécurité).
- Brancher le câble sur la pièce le plus près possible de la zone de soudage pour éviter que le courant ne circule sur une longue distance, par des chemins inconnus, et ne cause des risques d'électrocution et d'incendie.
- Ne pas utiliser le poste de soudage pour dégeler des conduites gelées.
- En cas de non utilisation, enlever la baguette d'électrode du porte−électrode ou couper le fil au raz du tube−contact.
- Porter des vêtements de protection exempts d'huile tels que des gants en cuir, une chemise en tissu épais, des pantalons sans revers, des chaussures montantes et un masque.
- Avant de souder, retirer tout produit combustible de ses poches, tel qu'un briquet au butane ou des allumettes.



## LES PARTICULES PROJETÉES peuvent blesser les yeux.

- Le soudage, le burinage, le passage de la pièce à la brosse métallique et le meulage provoquent l'émission d'étincelles et de particules métalliques. Pendant leur refroidissement, les soudures risquent de projeter du laitier.
- Porter des lunettes de sécurité à écrans latéraux agréés, même sous le masque de soudage.

## LES ACCUMULATIONS DE GAZ peuvent causer des blessures ou même la mort.

- Couper l'alimentation en gaz protecteur en cas de non utilisation.
- Veiller toujours à bien ventiler les espaces confinés ou porter un respirateur à adduction d'air agréé.

## LES PIÈCES CHAUDES peuvent causer des brûlures graves.

- Ne pas toucher les pièces chaudes à main nue.
- Prévoir une période de refroidissement avant d'utiliser le pistolet ou la torche.

## LES CHAMPS MAGNÉTIQUES peuvent perturber le fonctionnement des stimulateurs cardiaques.

- Les personnes qui portent un stimulateur cardiaque doivent se tenir à distance.
- Ils doivent consulter leur médecin avant de s'approcher d'un lieu où on exécute des opérations de soudage à l'arc, de gougeage ou de soudage par points.

## LE BRUIT peut affecter l'ouïe.

Le bruit de certains processus et équipements peut affecter l'ouïe.

- Porter des protecteurs d'oreille agréés si le niveau sonore est trop élevé.

## Les BOUTEILLES endommagées peuvent exploser.

Les bouteilles de gaz protecteur contiennent du gaz sous haute pression. Toute bouteille endommagée peut exploser. Comme les bouteilles de gaz font normalement partie du procédé de soudage, les manipuler avec précaution.

- Protéger les bouteilles de gaz comprimé de la chaleur excessive, des chocs mécaniques, du laitier, des flammes nues, des étincelles et des arcs.
- Placer les bouteilles debout en les fixant dans un support stationnaire ou dans un porte−bouteilles pour les empêcher de tomber ou de se renverser.
- Tenir les bouteilles éloignées des circuits de soudage ou autres circuits électriques.
- Ne jamais poser une torche de soudage sur une bouteille de gaz.
- Ne jamais mettre une électrode de soudage en contact avec une bouteille de gaz.
- Ne jamais souder une bouteille contenant du gaz sous pression − elle risquerait d'exploser.
- N'utiliser que les bouteilles de gaz protecteur, régulateurs, tuyaux et raccords adéquats pour l'application envisagée ; les maintenir en bon état, ainsi que les pièces connexes.
- Détourner la tête lorsqu'on ouvre la soupape d'une bouteille.
- Laisser le capuchon protecteur sur la soupape, sauf en cas d'utilisation ou de branchement de la bouteille
- Lire et suivre les instructions concernant les bouteilles de gaz comprimé, les équipements associés et les publications P−1 de la CGA, mentionnées dans les normes de sécurité.

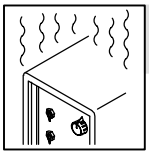
## 2-3. Autres symboles relatifs à l’installation, au fonctionnement et à l’entretien de l’appareil.

### Risque D’INCENDIE OU D’EXPLOSION

- Ne pas placer l’appareil sur une surface inflammable, ni au−dessus ou à proximité d’elle.
- Ne pas installer l’appareil à proximité de produits inflammables.
- Ne pas surcharger l’installation électrique − s’assurer que l’alimentation est correctement dimensionnée et protégée avant de mettre l’appareil en service.

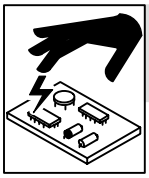
### LA CHUTE DE L’APPAREIL peut blesser.

- N’utiliser que l’anneau de levage pour lever l’appareil. NE PAS utiliser le chariot, les bouteilles de gaz ou tout autre accessoire.
- Utiliser un engin de capacité adéquate pour lever l’appareil.
- Si on utilise un chariot élévateur pour déplacer l’unité, s’assurer que les fourches sont suffisamment longues pour dépasser du côté opposé de l’appareil.



### L’EMPLOI EXCESSIF peut FAIRE SURCHAUFFER L’ÉQUIPEMENT.

- Prévoir une période de refroidissement ; respecter le cycle opératoire nominal.
- Réduire le courant ou le cycle opératoire avant de reprendre le soudage.
- Ne pas obstruer les orifices ou filtrer l’alimentation en air du poste.



### LES CHARGES ÉLECTROSTATIQUES peuvent endommager les circuits imprimés.

- Mettre un bracelet antistatique AVANT de manipuler des cartes ou des pièces.
- Utiliser des pochettes et des boîtes antistatiques pour stocker, déplacer ou expédier des cartes de circuits imprimés.

### LES PIÈCES MOBILES peuvent causer des blessures.

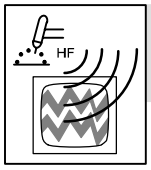
- Se tenir à l’écart des pièces mobiles.
- Se tenir à l’écart des points de coincement tels que les dévidoirs.

### LES FILS DE SOUDAGE peuvent causer des blessures.

- Ne pas appuyer sur la gâchette avant d’en avoir reçu l’instruction.
- Ne pas diriger le pistolet vers soi, vers d’autres personnes ou vers toute pièce mécanique en engageant le fil de soudage.

### LES ORGANES MOBILES peuvent causer des blessures.

- Se tenir à l’écart des organes mobiles comme les ventilateurs.
- Maintenir fermés et bien fixés les portes, panneaux, recouvrements et dispositifs de protection.

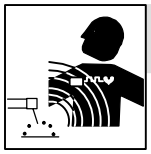



### LE RAYONNEMENT HAUTE FRÉQUENCE (H. F.) risque de causer des interférences.

- Le rayonnement haute fréquence peut causer des interférences avec les équipements de radionavigation et de communication, les services de sécurité et les ordinateurs.
- Ne demander qu’à des personnes qualifiées familiarisées avec les équipements électroniques de faire fonctionner l’installation.
- L’utilisateur est tenu de faire corriger rapidement par un électricien qualifié les interférences causées par l’installation.
- Si la Federal Communications Commission signale des interférences, arrêter immédiatement l’appareil.
- Faire régulièrement contrôler et entretenir l’installation.
- Maintenir soigneusement fermés les panneaux et les portes des sources de haute fréquence, maintenir le jeu d’éclatement au réglage adéquat et utiliser une terre et un blindage pour réduire les interférences éventuelles.

### LE SOUDAGE À L’ARC peut causer des interférences.

- L’énergie électromagnétique peut causer des interférences avec l’équipement électronique sensible tel que les ordinateurs et l’équipement commandé par ordinateur tel que les robots.
- Veiller à ce que tout l’équipement de la zone de soudage soit compatible au point de vue électromagnétique.
- Pour réduire la possibilité d’interférence, maintenir les câbles de soudage aussi courts que possible, les grouper, et les poser aussi bas que possible (par ex. : à terre).
- Veiller à souder à une distance de 100 mètres de tout équipement électronique sensible.
- Veiller à ce que le poste de soudage soit posé et mis à la terre conformément au présent manuel.
- En cas d’interférences après exécution des directives précédentes, il incombe à l’utilisateur de prendre des mesures supplémentaires telles que le déplacement du poste, l’utilisation de câbles blindés, l’utilisation de filtres de ligne ou la pose de protecteurs dans la zone de travail.



### LES CHAMPS MAGNÉTIQUES peuvent affecter les stimulateurs cardiaques.

- Porteurs de stimulateur cardiaque, restez à distance.
- Les porteurs d’un stimulateur cardiaque doivent d’abord consulter leur médecin avant de s’approcher des opérations de soudage à l’arc, de gougeage ou de soudage par points.

## 2-4. Principales normes de sécurité

Safety in Welding, Cutting, and Allied Processes, norme ANSI Z49.1, de l'American Welding Society, 550 N.W. LeJeune Rd, Miami FL 33126 (téléphone : (305) 443−9353, site Web : www.aws.org).

Recommended Safe Practices for the Preparation for Welding and Cutting of Containers and Piping, norme American Welding Society AWS F4.1, de l'American Welding Society, 550 N.W. LeJeune Rd, Miami, FL 33126 (téléphone : (305) 443−9353, site Web : www.aws.org).

National Electrical Code, norme NFPA 70, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101 (téléphone : (617) 770−3000, sites Web : www.nfpa.org et www.sparky.org).

Safe Handling of Compressed Gases in Cylinders, brochure CGA P−1, de la Compressed Gas Association, 1735 Jefferson Davis Highway, Suite 1004, Arlington, VA 22202−4102 (téléphone : (703) 412−0900, site Web : www.cganet.com).

Code for Safety in Welding and Cutting, norme CSA W117.2, de la Canadian Standards Association, Standards Sales, 178 boulevard Rexdale, Rexdale (Ontario) Canada M9W 1R3 (téléphone : (800) 463−6727 ou à Toronto : (416) 747−4044, site Web : www.csa−international.org).

Practice For Occupational And Educational Eye And Face Protection, norme ANSI Z87.1, de l'American National Standards Institute, 11 West 42nd Street, New York, NY 10036−8002 (téléphone : (212) 642−4900, site Web : www.ansi.org).

Standard for Fire Prevention During Welding, Cutting, and Other Hot Work, norme NFPA 51B, de la National Fire Protection Association, P.O. Box 9101, 1 Battery March Park, Quincy, MA 02269−9101 (téléphone : (617) 770−3000, site Web : www.nfpa.org et www.sparky.org).

OSHA, Occupational Safety and Health Standards for General Industry, Title 29, Code of Federal Regulations (CFR), Part 1910, Subpart Q, and Part 1926, Subpart J, de l'U.S. Government Printing Office, Superintendent of Documents, P.O. Box 371954, Pittsburgh, PA 15250 (il y a 10 bureaux régionaux − Téléphone pour la Région 5, Chicago : (312) 353−2220, site Web : www.osha.gov).

## 2-5. Information sur les champs électromagnétiques

Données sur le soudage électrique et les effets des champs magnétiques basse fréquence sur l'organisme

En parcourant les câbles de soudage, le courant crée des champs électromagnétiques. Les effets potentiels de tels champs restent préoccupants. Cependant, après avoir examiné plus de 500 études qui ont été faites pendant une période de recherche de 17 ans, un comité de spécialistes du National Research Council a conclu : « L'accumulation de preuves n'a pas démontré que l'exposition aux champs magnétiques et aux champs électriques à haute fréquence constitue un risque pour la santé humaine ». Toutefois, les études et l'examen des preuves se poursuivent. En attendant les conclusions finales de la recherche, il serait souhaitable de réduire l'exposition aux champs électromagnétiques pendant le soudage ou le coupage.

Afin de réduire les champs électromagnétiques en milieu de travail, respecter les consignes suivantes :

1. Garder les câbles ensemble en les torsadant ou en les fixant avec du ruban adhésif.
2. Mettre tous les câbles du côté opposé à l'opérateur.
3. Ne pas s'enrouler les câbles autour du corps.
4. Garder le poste de soudage et les câbles le plus loin possible de soi.
5. Placer la pince de masse le plus près possible de la zone de soudage.

**Consignes relatives aux stimulateurs cardiaques :**

Les personnes qui portent un stimulateur cardiaque doivent avant tout consulter leur médecin. Si ce dernier les déclare aptes, il leur est recommandé de respecter les consignes ci-dessus.

# SECTION 3 − SPECIFICATIONS

## 3-1. Specifications

### A. 115 VAC Model

| Rated Welding Output | Amperage Range | Maximum Open-Circuit Voltage DC | Amperes Input at Rated Load Output 115 V, 60 Hz, Single-Phase | KVA | KW | Weight W/ Gun | Overall Dimensions |
|---|---|---|---|---|---|---|---|
| 90 A @ 19 Volts DC, 20% Duty Cycle<br>63 A @ 21 Volts DC, 20% Duty Cycle* | 25 − 140 | 28 | 20<br>15* | 2.90<br>2.20* | 2.50<br>1.77* | 57 lb (26 kg) | Length: 19-1/2 in (495 mm)<br>Width: 10-5/8 in (270 mm)<br>Height: 12-3/8 in (314 mm) |
| **Wire Type And Diameter** | **Solid/ Stainless** | **Flux Cored** | **Aluminum** | **Wire Feed Speed Range** | | | |
| | .023 − .035 in (0.6 − 0.9 mm) | .030 − .035 in (0.8 − 0.9 mm) | .030 in (0.8 mm) | 50 − 740 IPM (1.3 − 18.8 m/min) At No Load<br>40 − 700 IPM (1.0 − 17.8 m/min) Feeding Wire | | | |
| *** CSA Rating** | | | | | | | |

### B. 230 VAC Model

| Rated Welding Output | Amperage Range | Maximum Open-Circuit Voltage DC | Amperes Input at Rated Load Output 230 V, 50/60 Hz, Single-Phase | KVA | KW | Weight W/ Gun | Overall Dimensions |
|---|---|---|---|---|---|---|---|
| 130 A @ 20 Volts DC, 30% Duty Cycle At 60 Hz Input − 20% Duty Cycle At 50 Hz Input | 25 − 180 | 30 | 20 | 4.60 | 3.75 | 68 lb (31 kg) | Length: 19-1/2 in (495 mm)<br>Width: 10-5/8 in (270 mm)<br>Height: 12-3/8 in (314 mm) |
| **Wire Type And Diameter** | **Solid/ Stainless** | **Flux Cored** | **Aluminum** | **Wire Feed Speed Range** | | | |
| | .023 − .035 in (0.6 − 0.9 mm) | .030 − .045 in (0.8 − 1.2 mm) | .030 − .035 in (0.8 − 0.9 mm) | 50 − 740 IPM (1.3 − 18.8 m/min) At No Load<br>40 − 700 IPM (1.0 − 17.8 m/min) Feeding Wire | | | |

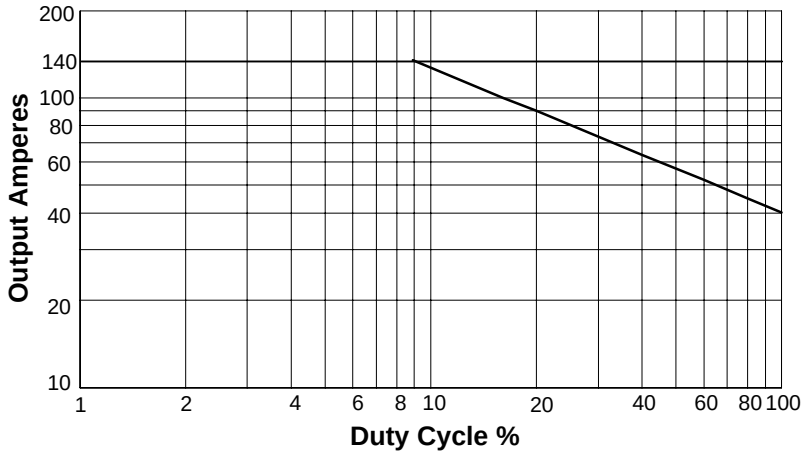
## 3-2. Duty Cycle And Overheating

Duty Cycle is percentage of 10 minutes that unit can weld at rated load without overheating.

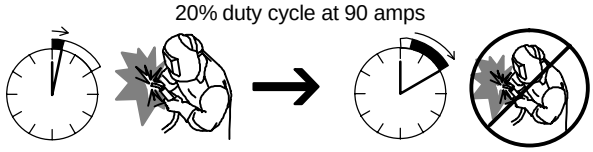
If unit overheats, thermostat(s) opens, output stops, and cooling fan runs. Wait fifteen minutes for unit to cool. Reduce amperage or duty cycle before welding.

▲ **Exceeding duty cycle can damage unit or gun and void warranty.**

### A. 115 VAC Model

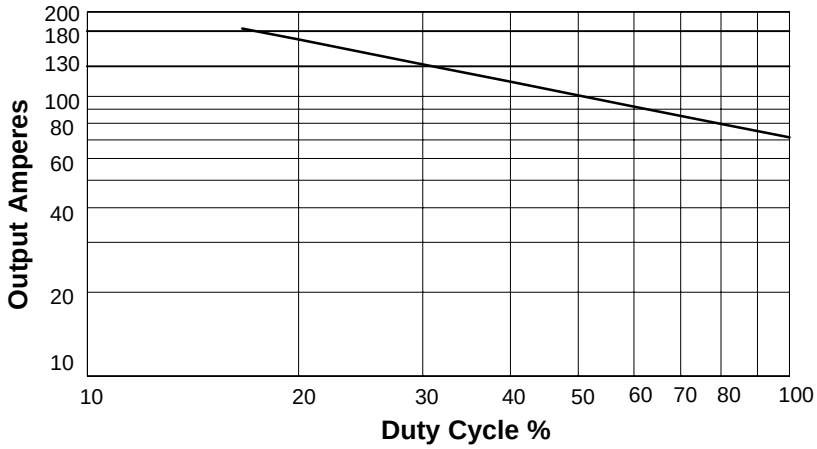



20% duty cycle at 90 amps

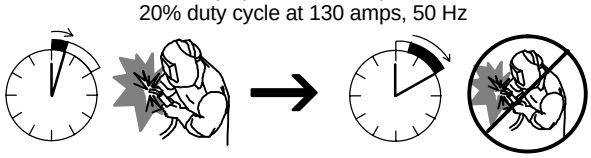


2 Minutes Welding  8 Minutes Resting

### B. 230 VAC Model

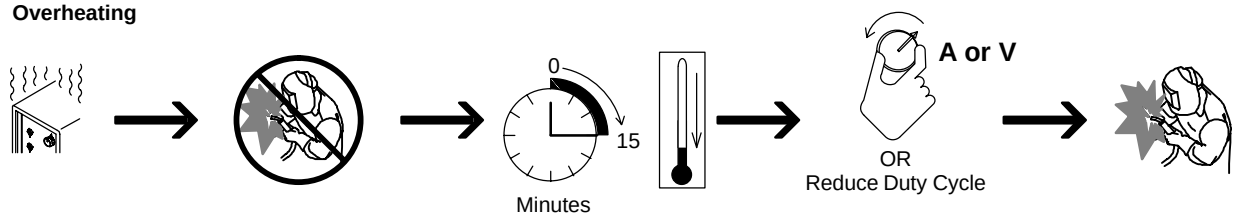



30% duty cycle at 130 amps, 60 Hz
20% duty cycle at 130 amps, 50 Hz



3 Minutes Welding  7 Minutes Resting

**Overheating**

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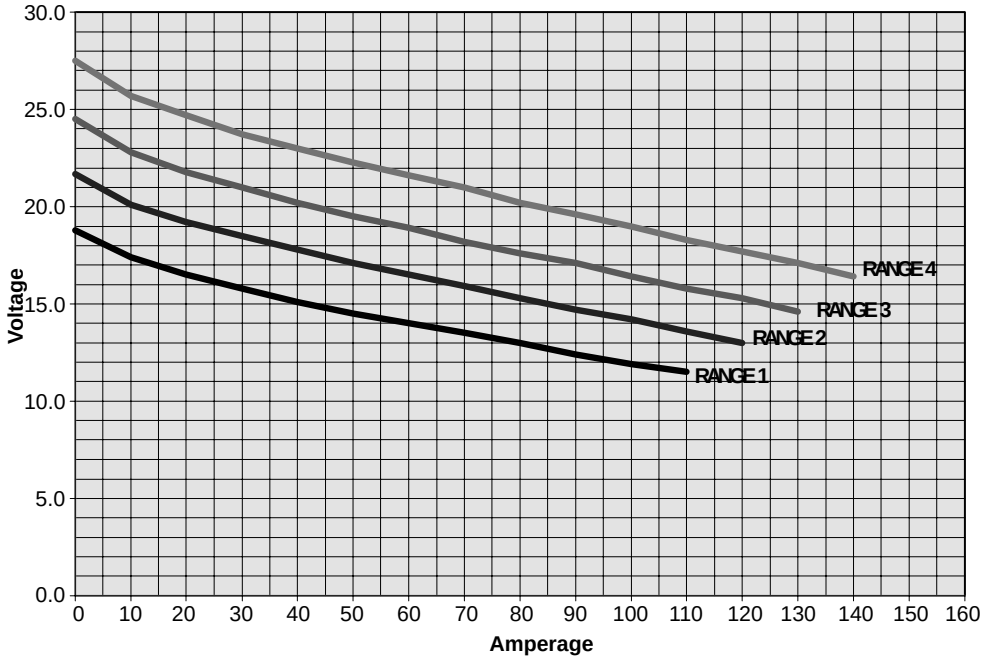
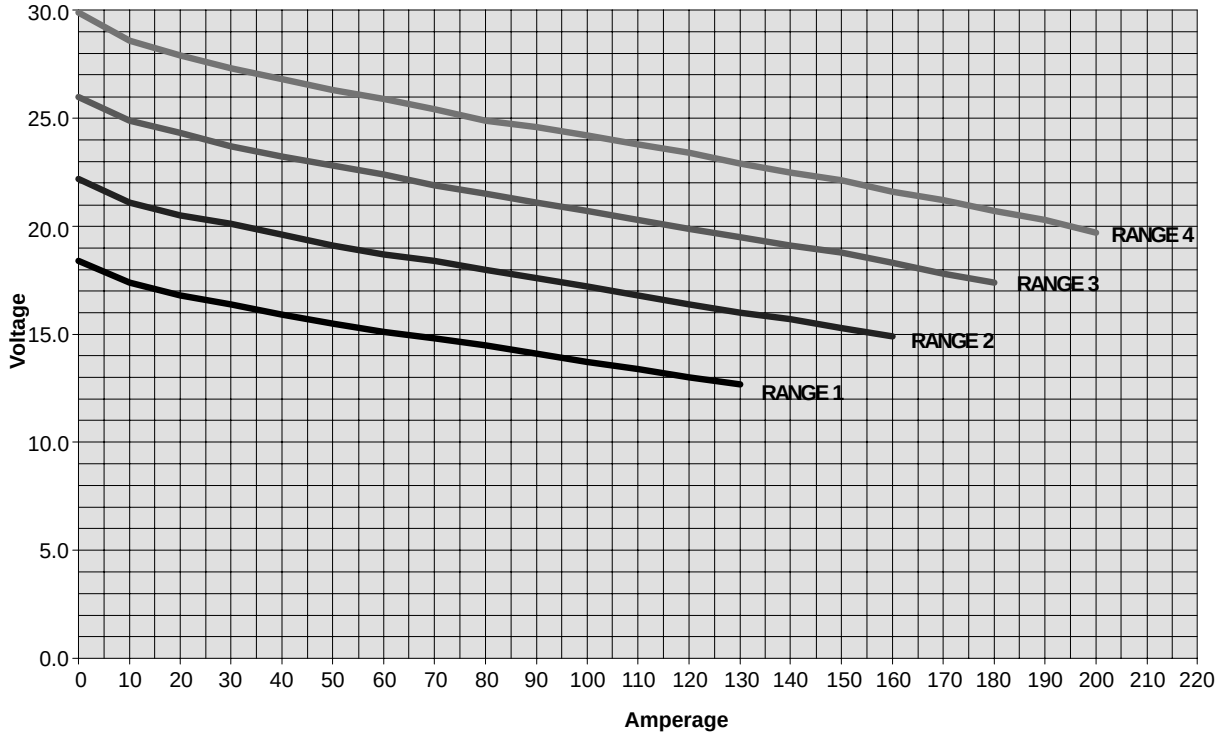
## 3-3. Volt-Ampere Curves

### A. 115 VAC Model

The volt-ampere curves show the minimum and maximum voltage and amperage output capabilities of the welding power source. Curves of other settings fall between the curves shown.




### B. 230 VAC Model

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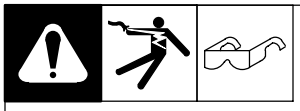
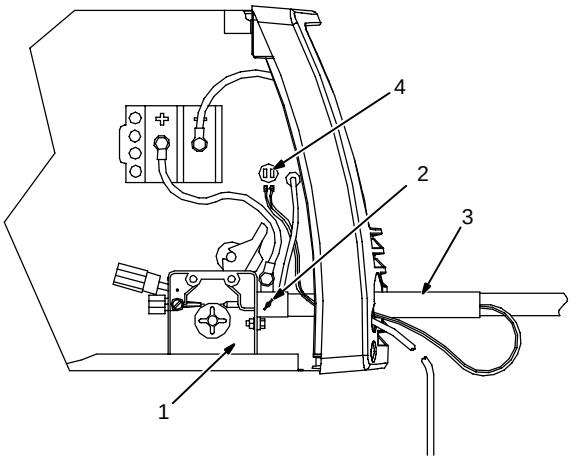
# SECTION 4 − INSTALLATION

## 4-1. Installing Welding Gun






1 Drive Assembly

2 Gun Securing Thumbscrew

3 Gun End

Loosen thumbscrew. Insert end through opening until it bottoms against drive assembly. Tighten thumbscrew.

Welding gun must be inserted completely to prevent leakage of shielding gas.

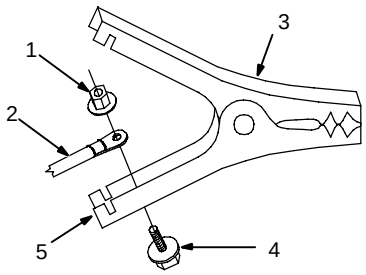
4 Gun Trigger Leads

Insert leads, one at a time, through gun opening on front panel. Connect female friction terminals to matching male terminals in unit. Polarity is not important.

Close door.

803 711-A

## 4-2. Installing Work Clamp




1 Nut

2 Work Cable From Unit

3 Work Clamp

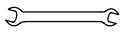
4 Screw

5 Work Clamp Tabs

Bend tabs around work cable.

☞ *Hardware must be tightened securely to prevent arcing and heating at connection.*

Tools Needed:



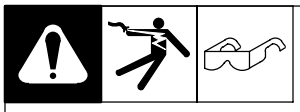
3/8, 7/16 in

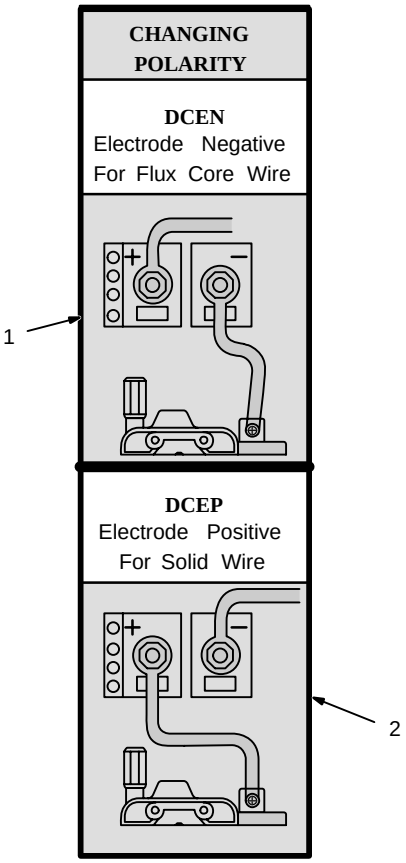
802 456

## 4-3. Process/Polarity Table

| Process | Polarity | Cable Connections | |
|---|---|---|---|
| | | Cable To Gun | Cable To Work |
| GMAW − Solid wire with shielding gas | DCEP − Reverse polarity | Connect to positive (+) output terminal | Connect to negative (−) output terminal |
| FCAW − Self-shielding wire − no shielding gas | DCEN − Straight Polarity | Connect to negative (−) output terminal | Connect to positive (+) output terminal |

## 4-4. Changing Polarity






1 Lead Connections For Direct Current Electrode Negative (DCEN)

2 Lead Connections For Direct Current Electrode Positive (DCEP)

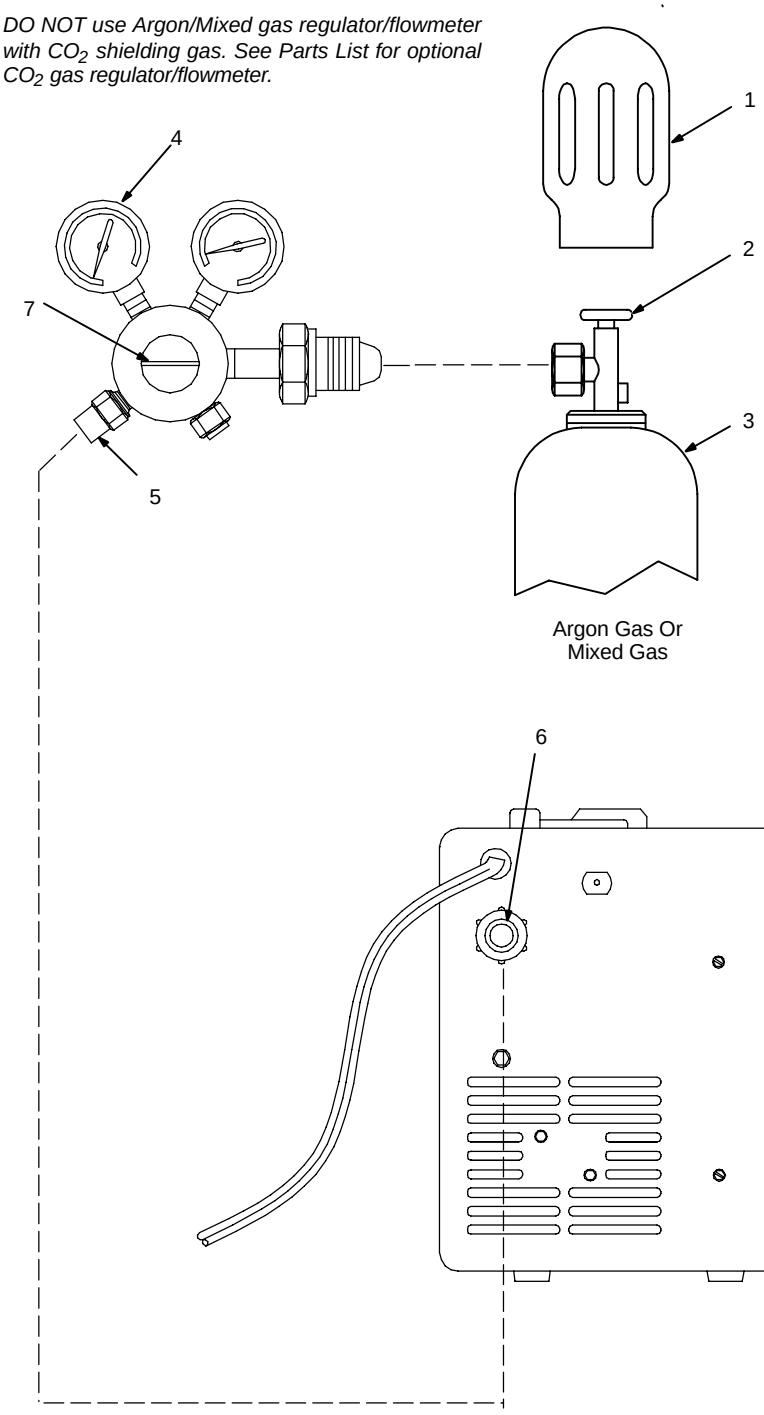
Always read and follow wire manufacturer's recommended polarity, and see Section 4-3.

Close door.

Ref. 209 228 / Ref. 209 229

## 4-5. Installing Gas Supply

☞ *DO NOT use Argon/Mixed gas regulator/flowmeter with $CO_2$ shielding gas. See Parts List for optional $CO_2$ gas regulator/flowmeter.*




Obtain gas cylinder and chain to running gear, wall, or other stationary support so cylinder cannot fall and break off valve.

1 Cap

2 Cylinder Valve

Remove cap, stand to side of valve, and open valve slightly. Gas flow blows dust and dirt from valve. Close valve.

3 Cylinder

4 Regulator/Flowmeter

Install so face is vertical.

5 Regulator/Flowmeter Gas Hose Connection

6 Welding Power Source Gas Hose Connection

Connect supplied gas hose between regulator/flowmeter gas hose connection, and fitting on rear of welding power source.

7 Flow Adjust

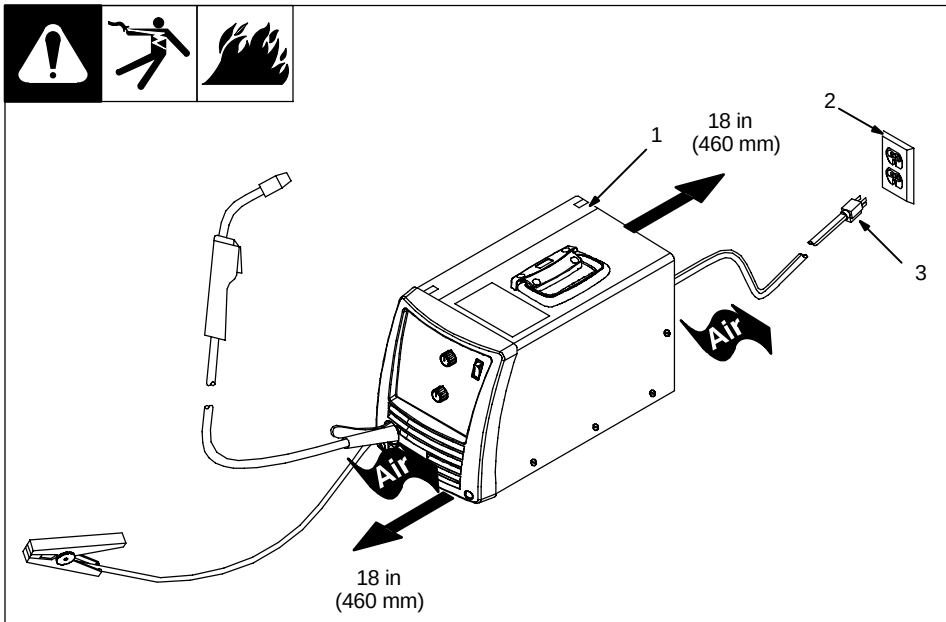
Turn flow adjust screw to increase or decrease gas flow. Flow rate should be set when gas is flowing through welding power source and welding gun. Turn Range switch to Purge or Fan Only position. Press gun trigger to start gas flow. Typical flow rate is 20 cfh (cubic feet per hour). Check wire manufacturer's recommended flow rate.

Tools Needed:

5/8, 1-1/8 in

Ref. 802 028-A / 802 441

## 4-6. Selecting A Location And Connecting Input Power For 115 VAC Model




1 Rating Label

2 Grounded Receptacle

A 115 volt, 20 ampere individual branch circuit protected by time-delay fuses or circuit breaker is required.

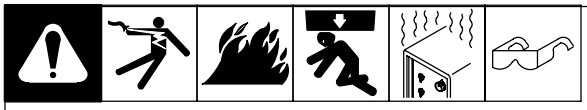
3 Plug From Unit

Select extension cord of 14 AWG for up to 50 ft (15 m) or 12 AWG for 50 up to 200 ft (61 m).

▲ **Special installation may be required where gasoline or volatile liquids are present – see NEC Article 511 or CEC Section 20.**

803 712-A

## 4-7. Selecting A Location And Connecting Input Power For 230 VAC Model



1 Rating Label

Supply correct input power.

2 Plug (NEMA 6-50P)

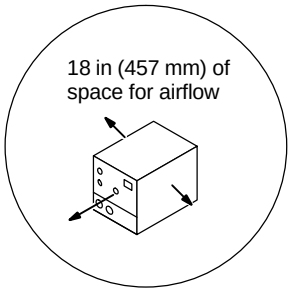
3 Receptacle (NEMA 6-50R)

Connect plug to receptacle.

4 Line Disconnect Device

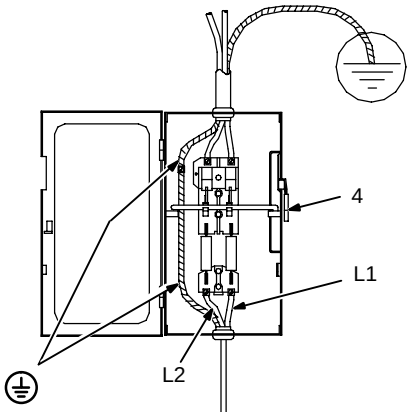
See Section 4-8.

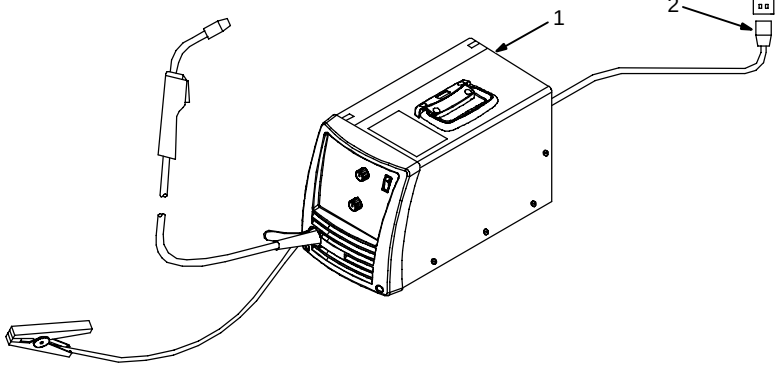
▲ **Special installation may be required where gasoline or volatile liquids are present − see NEC Article 511 or CEC Section 20.**

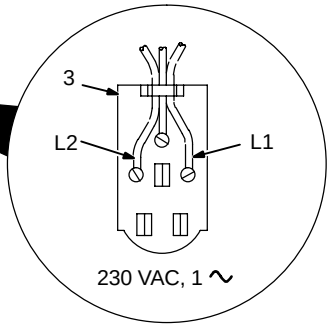



▲ **Always connect grounding conductor first.**

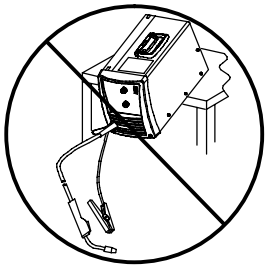
⏚ **= GND/PE**




▲ **Do not move or operate unit where it could tip.**



ssb2.2* 1/94 − 803 713-A



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## 4-8. Electrical Service Guide For 230 VAC Model

| | |
|---|---|
| **Input Voltage** | 230 |
| **Input Amperes At Rated Output** | 20 |
| **Max Recommended Standard Fuse Or Circuit Breaker Rating In Amperes** | |
| **Circuit Breaker [1], Time-Delay [2]** | 25 |
| **Normal Operating [3]** | 30 |
| **Min Input Conductor Size In AWG** | 14 |
| **Max Recommended Input Conductor Length In Feet (Meters)** | 67 (20) |
| **Min Grounding Conductor Size In AWG** | 14 |

Reference: 1999 National Electrical Code (NEC)

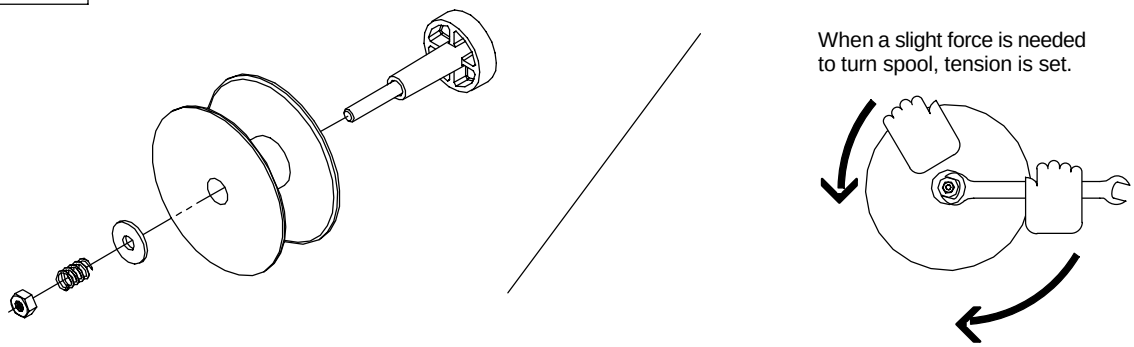
1 Choose a circuit breaker with time-current curves comparable to a Time Delay Fuse.

2 “Time-Delay” fuses are UL class “RK5” .

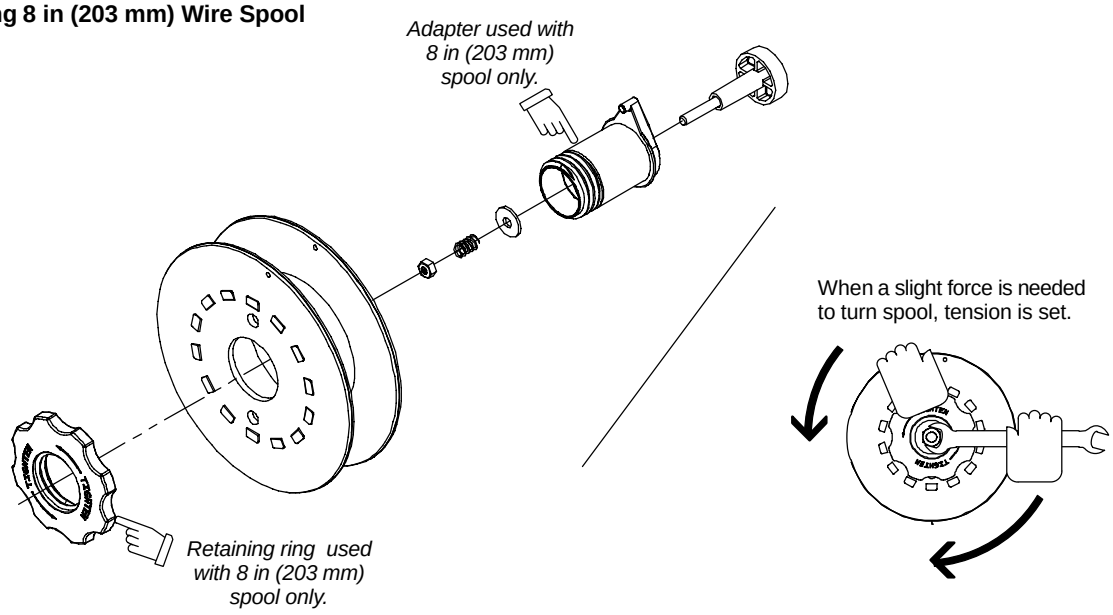
3 “Normal Operating” (general purpose − no intentional delay) fuses are UL class “K5” (up to and including 60 amp), and UL class “H” ( 65 amp and above).

## 4-9. Installing Wire Spool And Adjusting Hub Tension

**Installing 4 in (102 mm) Wire Spool**




**Installing 8 in (203 mm) Wire Spool**



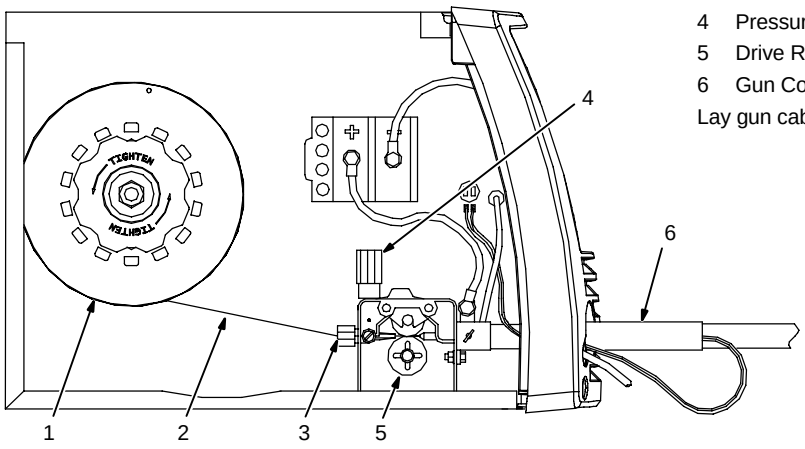

Tools Needed:

803 012 / 803 013 -B / Ref. 802 971-C

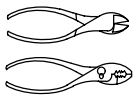
## 4-10. Threading Welding Wire

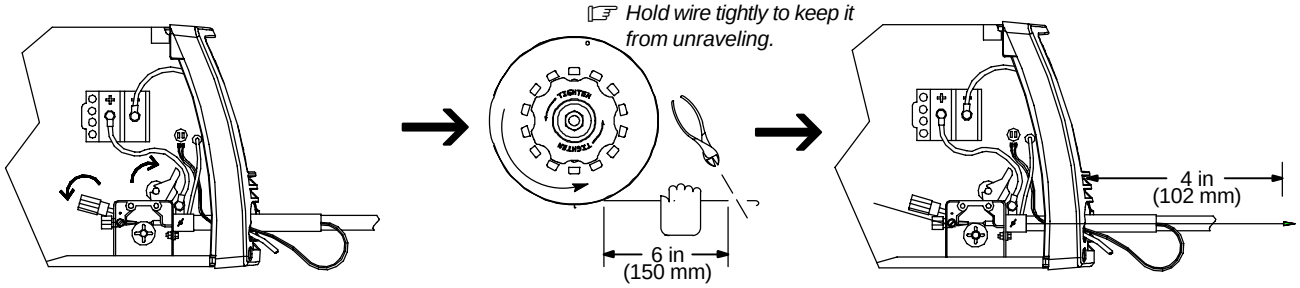
1 Wire Spool
2 Welding Wire
3 Inlet Wire Guide
4 Pressure Adjustment Knob
5 Drive Roll
6 Gun Conduit Cable

Lay gun cable out straight.




Tools Needed:

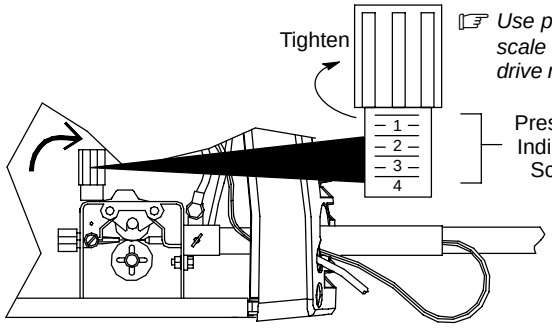




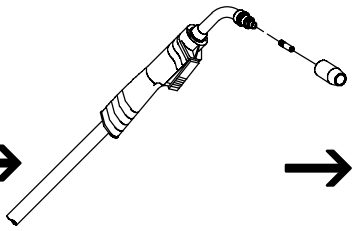

Open pressure assembly. Make sure feed roll is set to correct groove to match wire size (see Section 6-4).

Pull and hold wire; cut off end.

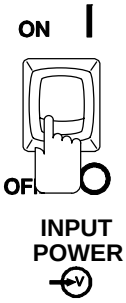
Push wire thru guides into gun; continue to hold wire.



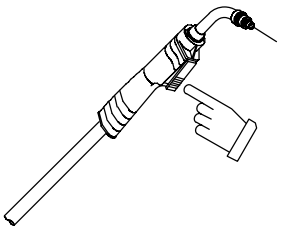

Be sure that wire is positioned in proper feed roll groove. Close and tighten pressure assembly, and let go of wire.



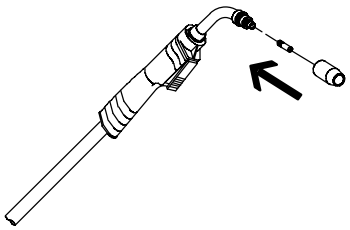
Remove gun nozzle and contact tip.



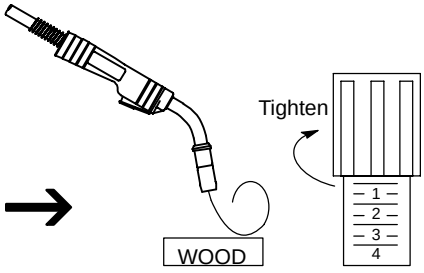

Turn power on. Be sure that Voltage range switch is set to range 1, 2, 3, or 4 to feed wire. Rotate knob until it “clicks” into detent. Wire will not feed if range switch is set between ranges or if set in the “PURGE” position.



Press gun trigger until wire comes out of gun.



Be sure that tip matches wire diameter. Reinstall contact tip and nozzle.




Feed wire to check drive roll pressure. Tighten knob enough to prevent slipping. Cut off wire. Close door.

Ref. 803 714-A



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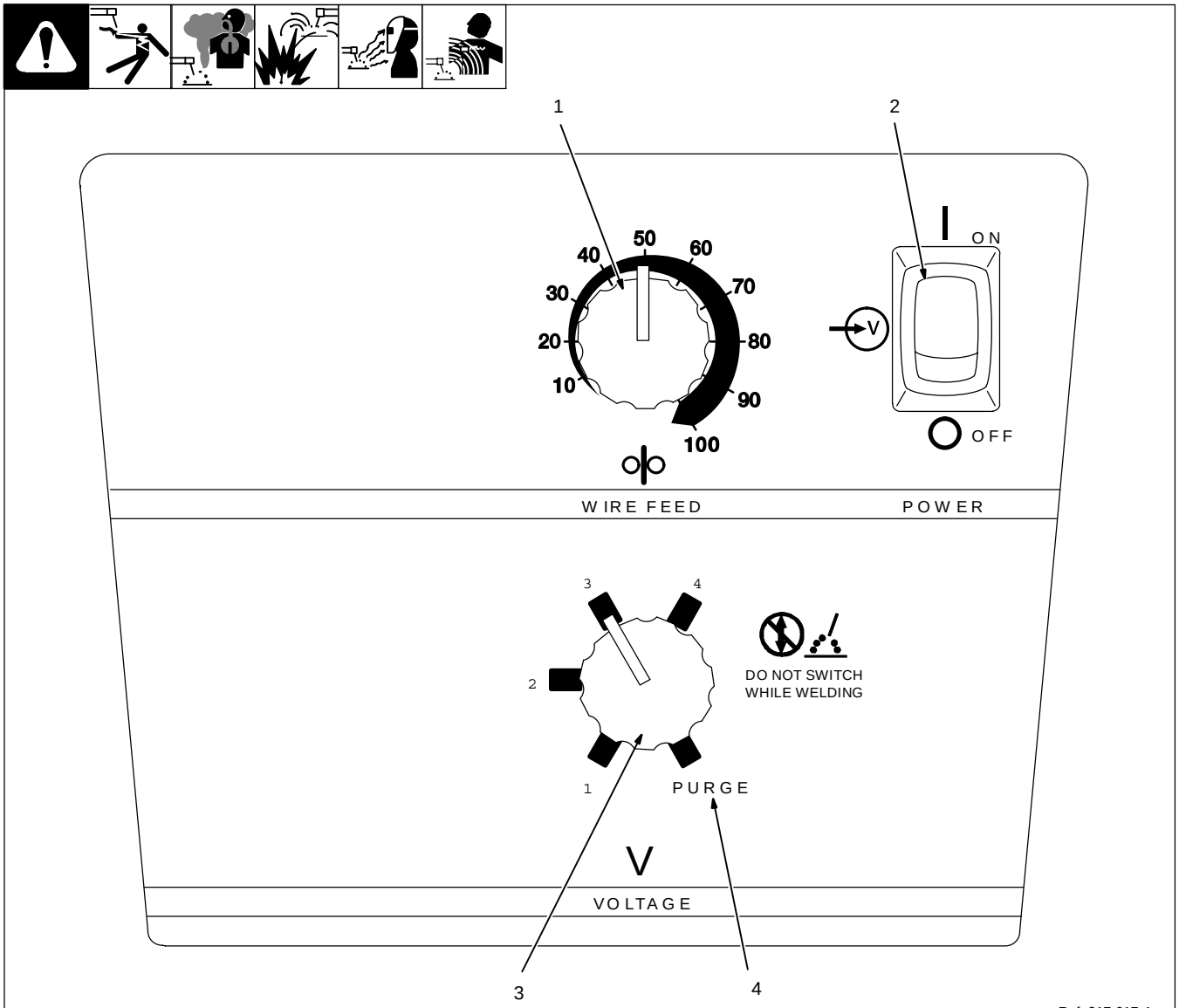
# SECTION 5 – OPERATION

## 5-1. Controls




Ref. 217 617-A

1 Wire Speed Control

Use control to select a wire feed speed. As Voltage switch setting increases, wire speed range also increases (see weld setting label in welding power source or Sections 5-2 or 5-3, as applicable).

2 Power Switch

3 Voltage Switch

The higher the selected number, the thicker the material that can be welded (see weld setting label in welding power source or Sections 5-2 and 5-3, as applicable). Do not switch under load.

☞ *Switch must "click" into detent position 1, 2, 3, 4, or purge for proper contact.*

4 Voltage Switch - "Purge" Position

In purge position, fan runs but there is no weld output or wire feed. Use "PURGE" setting when adjusting gas flow at the regulator.

## 5-2. Weld Parameter Chart For 115 VAC Model

# Welding Guide for 115 Volt

**Settings are approximate. Adjust as required. Thicker materials can be welded using proper technique, joint preparation and multiple passes.**

| Material Being Welded | Wire Type and Polarity Setting | Suggested Shielding Gas 20−30 CFH Flow Rate | Diameter of Wire Being Used | 24 ga. .024 in. (0.6 mm) | |
|---|---|---|---|---|---|
| **Steel** | **Flux Cored E71T−11 (DCEN)** | **No shielding gas required** Good for windy or outdoor applications. | .030” (0.8 mm) | ~ | |
| | | | .035” (0.9 mm) | ~ | |
| **Steel** | **Solid Wire ER70S−6 (DCEP)** | **$C_{25}$ Gas Mixture** 75% Argon / 25% $CO_2$ Produces less spatter. Better appearance. | .024” (0.6 mm) | 1 / 25 | |
| | | | .030” (0.8 mm) | ~ | |
| | | | .035” (0.9 mm) | ~ | |
| **Steel** | **Solid Wire ER70S−6 (DCEP)** | **100% $CO_2$** | .024” (0.6 mm) | ~ | |
| | | | .030” (0.8 mm) | ~ | |
| | | | .035” (0.9 mm) | ~ | |
| **Stainless Steel** | **Stainless Steel (DCEP)** | **Tri−Mix** 90% He / 7.5% Ar / 2.5% $CO_2$ | .024” (0.6 mm) | ~ | |
| | | | .030” (0.8 mm) | ~ | |
| **Aluminum** | **Aluminum** (DCEP)** | **100% Argon**** | .030” (0.8 mm) | ~ | |

Match feedroll groove to diameter of wire being used.
Set Tension Knob Setting to 3 at start.
Adjust tension per instructions in the manual.

**CAUTION!** Do not change Voltage switch position while welding. See owner’s manual for more information.

***Multiple passes required.** ****Aluminum wire is soft so feedability is not as good.**

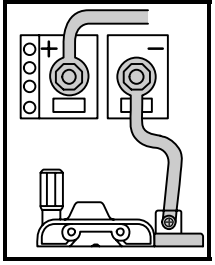
# Wire Welding Package

**Recommended Voltage and Wire Speed Settings for thickness of metal being welded.**
**Number left of slash is Voltage Setting / Number right of slash is Wire Feed Setting.**

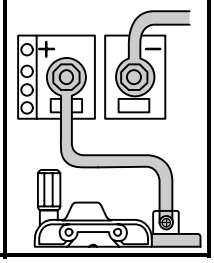
| 20 ga. .036 in. (0.8 mm) | 18 ga. .048 in. (1.2 mm) | 16 ga. .060 in. (1.6 mm) | 11 ga. 1/8 inch (3.2 mm) | 3/16 inch (4.8 mm) | 1/4 inch (6.4 mm) |
|---|---|---|---|---|---|
| ~ | 1 / 30 | 2 / 30 | 3 / 40 | 4 / 45 | ~ |
| ~ | ~ | 2 / 20 | 3 / 20 | 4 / 35 | 4 / 50* |
| 2 / 30 | 3 / 40 | 3 / 50 | 4 / 70 | ~ | ~ |
| 2 / 20 | 2 / 30 | 3 / 35 | 4 / 40 | ~ | ~ |
| ~ | 3 / 25 | 3 / 30 | 4 / 40 | ~ | ~ |
| 2 / 30 | 3 / 30 | 3 / 40 | 4 / 40 | ~ | ~ |
| ~ | 3 / 20 | 4 / 30 | 4 / 35 | ~ | ~ |
| ~ | ~ | 4 / 25 | 4 / 30 | ~ | ~ |
| ~ | 2 / 30 | 3 / 40 | 4 / 50 | ~ | ~ |
| ~ | 2 / 15 | 3 / 10 | 4 / 30 | ~ | ~ |
| ~ | ~ | 3 / 90** | 4 / 90** | ~ | ~ |

**CHANGING POLARITY**

**DCEN**
Electrode Negative
For Flux Cored Wire




**DCEP**
Electrode Positive
For Solid Wire




**Wire Speed listed is a starting value only**. Wire Speed setting can be fine−tuned while welding. Wire Speed also depends on other variables such as stick out, travel speed, weld angle, cleanliness of metal, etc.

**Make sure that hub tension is not too tight and keep the torch straight as possible. A "push angle" for the torch is recommended.**

217 618-A

## 5-3. Weld Parameter Chart For 230 VAC Model

# Welding Guide for 230 Volt

**Settings are approximate. Adjust as required. Thicker materials can be welded using proper technique, joint preparation and multiple passes.**

| Material Being Welded | Wire Type and Polarity Setting | Suggested Shielding Gas 20−30 CFH Flow Rate | Diameter of Wire Being Used | 24 ga. .024 in. (0.6 mm) | 20 ga. .036 in. (0.8 mm) |
|---|---|---|---|---|---|
| **Steel** | **Flux Cored E71T−11 (DCEN)** | **No shielding gas required** Good for windy or outdoor applications. | .030” (0.8 mm) | ~ | ~ |
| | | | .035” (0.9 mm) | ~ | ~ |
| | | | .045” (1.2 mm) | ~ | ~ |
| **Steel** | **Solid Wire ER70S−6 (DCEP)** | **$C_{25}$ Gas Mixture** 75% Argon / 25% $CO_2$ Produces less spatter. Better appearance. | .024” (0.6 mm) | 1 / 30 | 1 / 35 |
| | | | .030” (0.8 mm) | ~ | 1 / 30 |
| | | | .035” (0.9 mm) | ~ | ~ |
| **Steel** | **Solid Wire ER70S−6 (DCEP)** | **100% $CO_2$** | .024” (0.6 mm) | ~ | ~ |
| | | | .030” (0.8 mm) | ~ | ~ |
| | | | .035” (0.9 mm) | ~ | ~ |
| **Stainless Steel** | **Stainless Steel (DCEP)** | **Tri−Mix** 90% He / 7.5% Ar / 2.5% $CO_2$ | .024” (0.6 mm) | ~ | ~ |
| | | | .030” (0.8 mm) | ~ | ~ |
| | | | .035” (0.9 mm) | ~ | ~ |
| **Aluminum** | **Aluminum** (DCEP)** | **100% Argon**** | .030” (0.8 mm) | ~ | ~ |
| | | | .035” (0.9 mm) | ~ | ~ |

Match feedroll groove to diameter of wire being used.
Set Tension Knob Setting to 3 at start.
Adjust tension per instructions in the manual.

**CAUTION!** Do not change Voltage switch position while welding. See owners manual for more information.

***Multiple passes required. **Aluminum wire is soft so feedability is not as good.**



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# Wire Welding Package

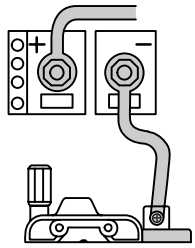
**Recommended Voltage and Wire Speed Settings for thickness of metal being welded.**
**Number left of slash is Voltage Setting / Number right of slash is Wire Feed Setting.**

| 18 ga. .048 in. (1.2 mm) | 16 ga. .060 in. (1.6 mm) | 11 ga. 1/8 inch (3.2 mm) | 3/16 inch (4.8 mm) | 1/4 inch (6.4 mm) | 5/16 inch (8.0 mm) |
|---|---|---|---|---|---|
| 1 / 10 | 1 / 30 | 3 / 50 | 3 / 60 | 4 / 70* | ~ |
| ~ | 1 / 20 | 3 / 40 | 3 / 50 | 4 / 60 | 4 / 75* |
| ~ | ~ | 2 / 20 | 3 / 40 | 4 / 50 | 4 / 60* |
| 1 / 45 | 2 / 50 | 3 / 90 | ~ | ~ | ~ |
| 1 / 40 | 2 / 40 | 3 / 80 | 4 / 85 | ~ | ~ |
| 1 / 25 | 2 / 30 | 3 / 75 | 3 / 80 | 4 / 60* | ~ |
| 2 / 30 | 2 / 35 | 3 / 70 | ~ | ~ | ~ |
| 2 / 20 | 2 / 30 | 3 / 65 | 4 / 40 | ~ | ~ |
| 2 / 10 | 2 / 20 | 3 / 55 | 4 / 30 | 4 / 60* | ~ |
| 2 / 25 | 2 / 40 | 3 / 50 | ~ | ~ | ~ |
| 2 / 15 | 2 / 20 | 2 / 40 | 4 / 80 | ~ | ~ |
| ~ | 2 / 10 | 2 / 30 | 4 / 70 | ~ | ~ |
| ~ | 1 / 100** | 4 / 100** | ~ | ~ | ~ |
| ~ | 1 / 95** | 4 / 90** | ~ | ~ | ~ |

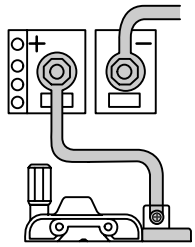
**Wire Speed listed is a starting value only.** Wire Speed setting can be fine−tuned while welding. Wire Speed also depends on other variables such as stick out, travel speed, weld angle, cleanliness of metal, etc.

**CHANGING POLARITY**

**DCEN**
Electrode Negative
For Flux Cored Wire




**DCEP**
Electrode Positive
For Solid Wire

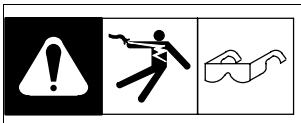



**Make sure that hub tension is not too tight and keep the torch straight as possible. A ”push angle” for the torch is recommended.**

217 754-

# SECTION 6 − MAINTENANCE &TROUBLESHOOTING

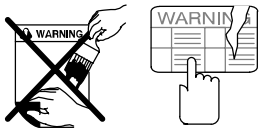
## 6-1. Routine Maintenance



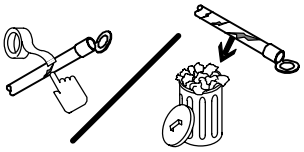
▲ **Disconnect power before maintaining.**

**3 Months**

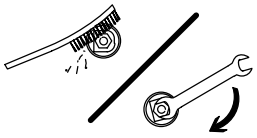
Replace unreadable labels.




Repair or replace cracked weld cable.

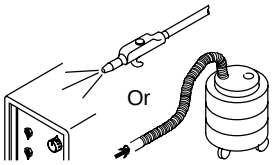


Clean and tighten weld terminals.



**6 Months**

Blow out or vacuum inside. During heavy service, clean monthly.

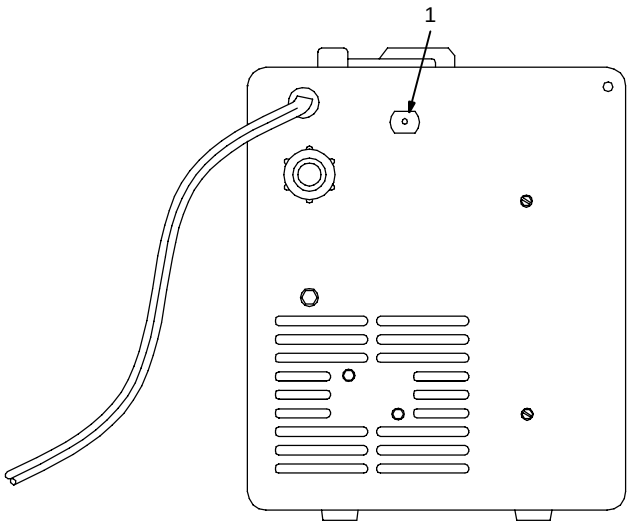



## 6-2. Overload Protection

1 Circuit Breaker CB1

CB1 protects unit from overload. If CB1 opens, unit shuts down.

Reset breaker.

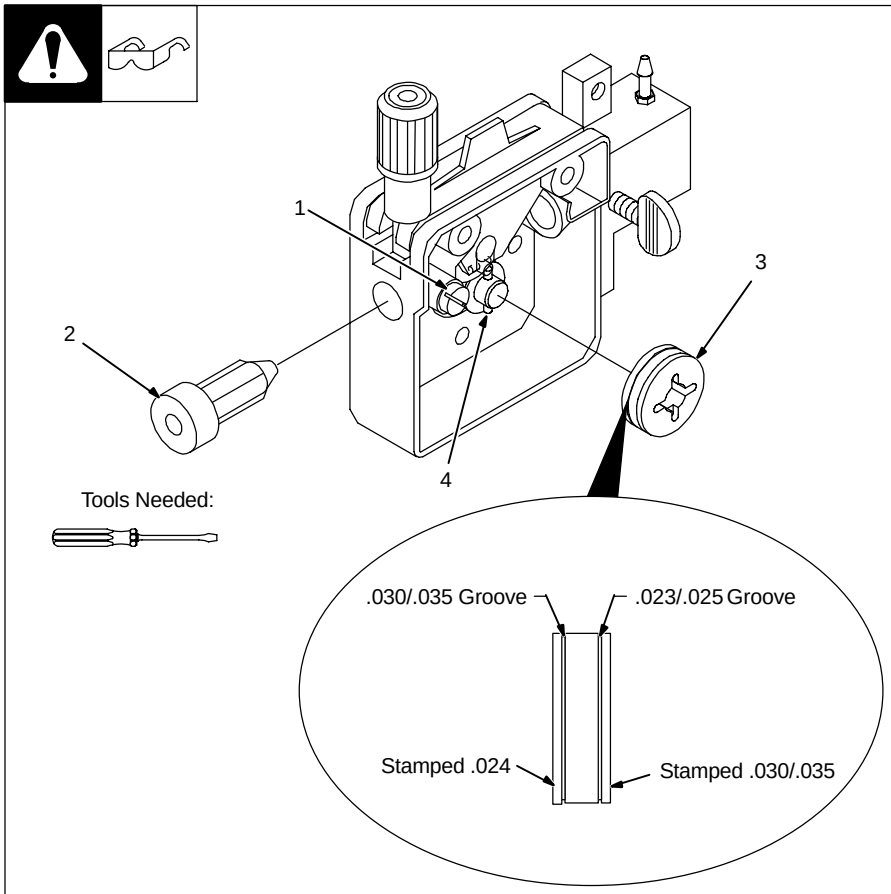



802 441

## 6-3. Drive Motor Protection

Drive motor protection circuit protects drive motor from overload. If drive motor becomes inoperative, release gun trigger and wait until protection circuit resets allowing drive motor to feed wire again.

## 6-4. Changing Drive Roll Or Wire Inlet Guide




1 Inlet Wire Guide Securing Screw

2 Inlet Wire Guide

Loosen screw. Slide tip as close to drive rolls as possible without touching. Tighten screw.

3 Drive Roll

The drive roll consists of two different sized grooves. The stamped markings on the end surface of the drive roll refers to the groove on the opposite side of the drive roll. The groove closest to the motor shaft is the proper groove to thread (see Section 4-10).

4 Retaining Pin

To secure drive roll, locate open slot and push drive roll completely over retaining pin, then rotate drive roll (1/4 turn) to closed slot.

Ref. 803 714-A

## 6-5. Replacing Gun Contact Tip

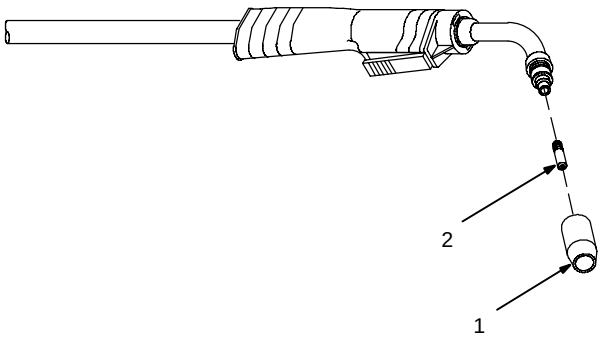
▲ **Turn Off power before replacing contact tip.**

1 Nozzle

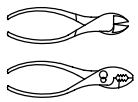
2 Contact Tip

Cut off welding wire at contact tip. Remove nozzle.

Remove contact tip and install new contact tip. Reinstall nozzle.




Tools Needed:

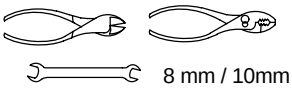


Ref. 802 399-A

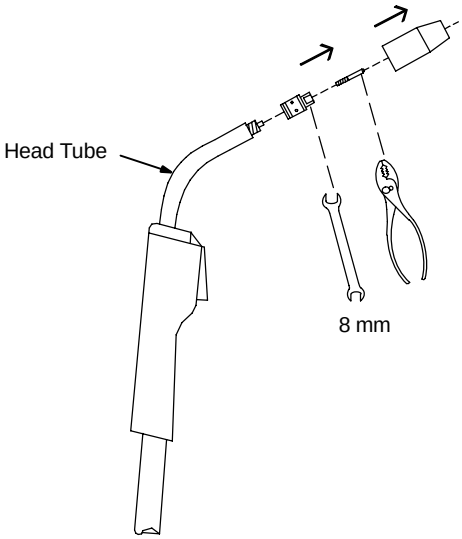
## 6-6. Cleaning Or Replacing Gun Liner

▲ **Disconnect gun from unit.**

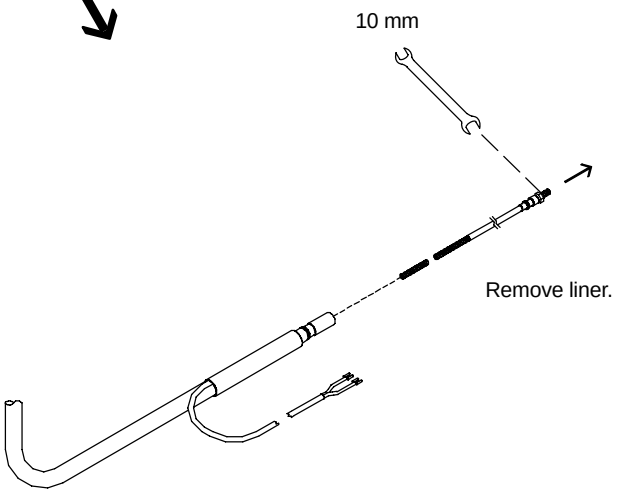
Tools Needed:



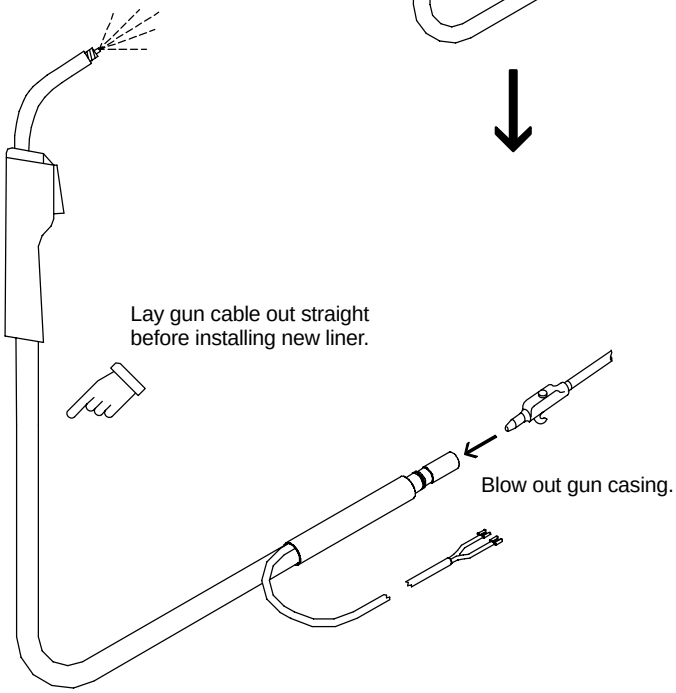
8 mm / 10mm




Remove nozzle, contact tip, adapter, gas diffuser, and wire outlet guide.




Remove liner.



Lay gun cable out straight before installing new liner.

Blow out gun casing.

**To Reassemble Gun:**

Insert new liner.

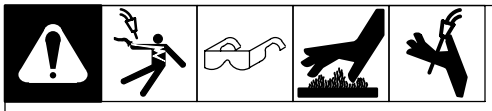
Install wire outlet guide so that 1/8 in (3 mm) of liner sticks out. Hand tighten outlet guide, and then tighten two full turns more.

Cut liner off so that 3/4 in (19 mm) sticks out of head tube.

Install gas diffuser, adapter, contact tip, and nozzle.

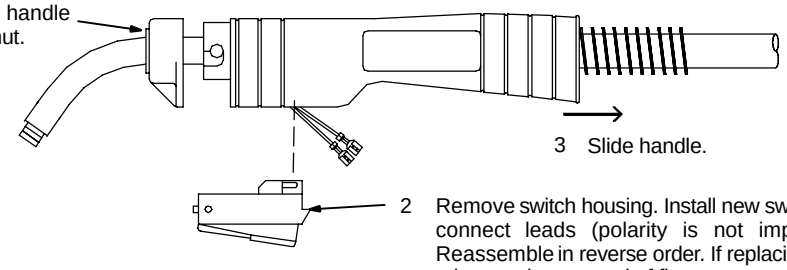
Ref. 802 446

## 6-7. Replacing Switch And/Or Head Tube



▲ **Turn Off welding power source /wire feeder and disconnect gun.**

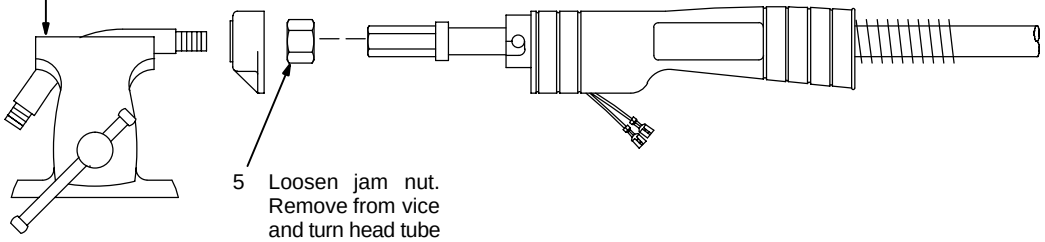
1 Remove handle locking nut.



3 Slide handle.

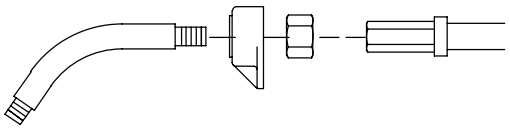
2 Remove switch housing. Install new switch and connect leads (polarity is not important). Reassemble in reverse order. If replacing head tube, continue to end of figure.

4 Secure head tube in vice.

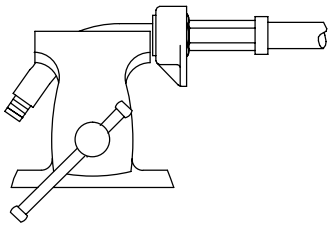


5 Loosen jam nut. Remove from vice and turn head tube out by hand.

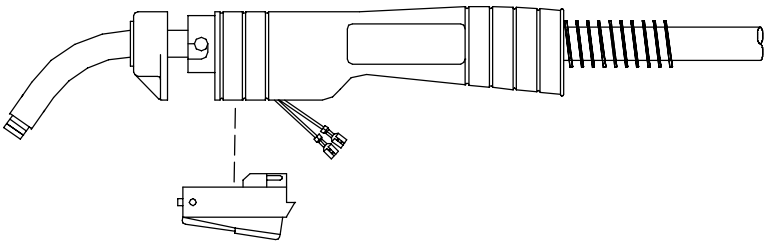
6 Hand-tighten head tube into cable connector.



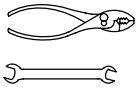
7 Place head tube in vice and tighten until nuts are tight.



8 Remove from vice. Reposition handle and install switch housing. Secure with handle locking nut.



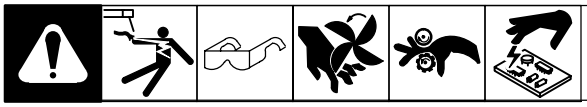
Tools Needed:



19 mm

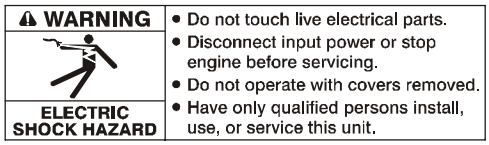
Ref. ST-800 795-C

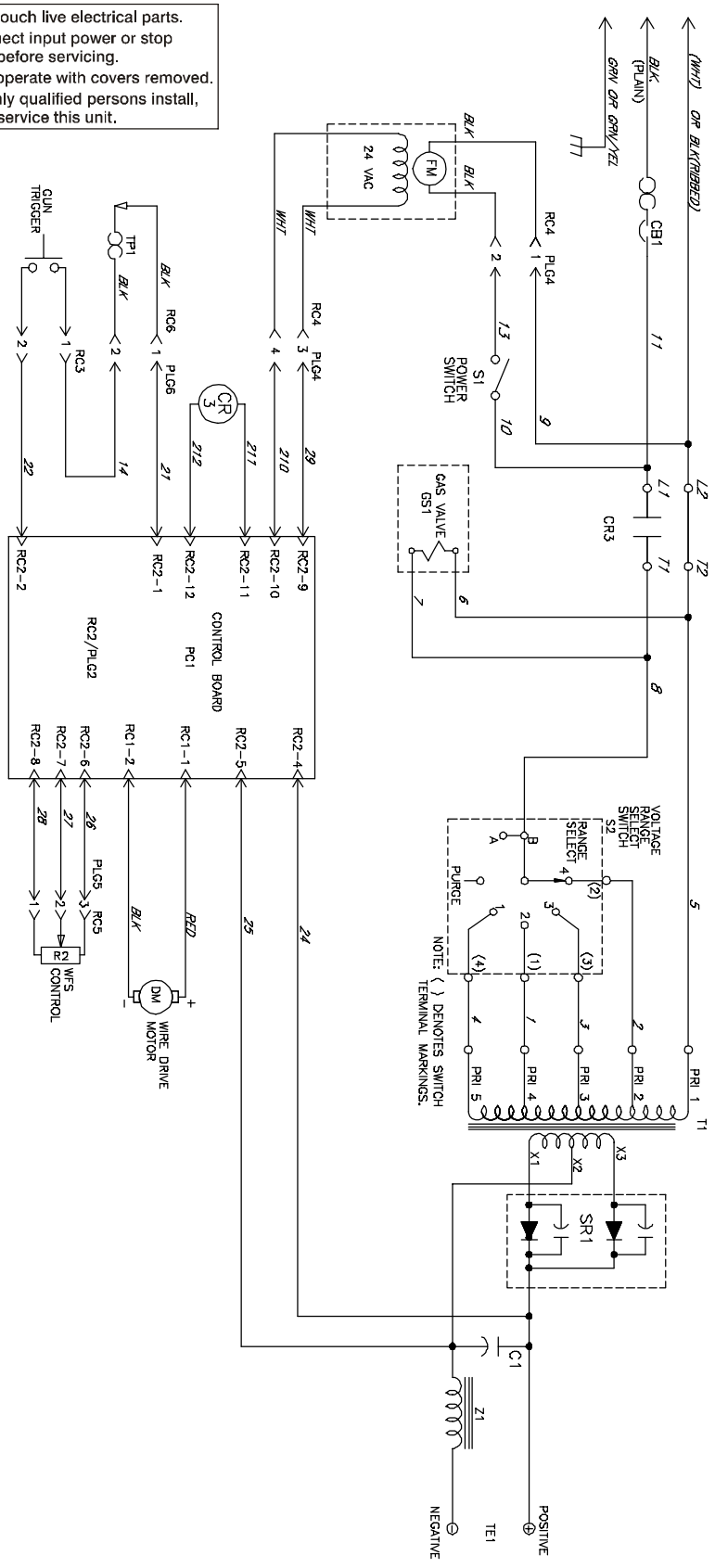
## 6-8. Troubleshooting Table



| Trouble | Remedy |
|---|---|
| No weld output; wire does not feed; fan does not run. | Secure power cord plug in receptacle (see Section 4-6). |
| | Replace building line fuse or reset circuit breaker if open. |
| | Place Power switch in On position (see Section 5-1). |
| | Reset welding power source circuit breaker if open. |
| No weld output; wire does not feed; fan motor continues to run. | Thermostat TP1 open (overheating). Allow fan to run with gun trigger switch off; thermostat closes when unit has cooled (see Section 3-2). |
| | Check Voltage range switch position. Rotate knob until it “clicks” into detent at desired range setting. |
| | Voltage range switch set in “PURGE” position. Set switch to position 1, 2, 3, or 4. |
| | Secure gun trigger leads (see Section 4-1). |
| No weld output; wire feeds. | Connect work clamp to get good metal to metal contact. |
| | Replace contact tip (see Section 6-5). |
| | Check for proper polarity connections (see Section 4-4). |
| | Check thumbscrew securing gun end to feed head adapter and tighten if necessary. |
| Low weld output. | Connect unit to proper input voltage or check for low line voltage. |
| | Place voltage switch in desired position (see Section 5-1). |
| Electrode wire feeding stops during welding. | Straighten gun cable and/or replace damaged parts. |
| | Adjust drive roll pressure (see Section 4-10). |
| | Change to proper drive roll groove (see Section 6-4). |
| | Readjust hub tension (see Section 4-9). |
| | Replace contact tip if blocked (see Section 6-5). |
| | Clean or replace wire inlet guide or liner if dirty or plugged (see Section 6-4 or Section 6-6). |
| | Replace drive roll or pressure bearing if worn or slipping (see Section 6-4). |
| | Secure gun trigger leads or repair leads (see Section 4-1). |
| | Check and clear any restrictions at drive assembly and liner (see Section 4-10 or Section 6-6). |
| | Release gun trigger and allow gun and motor protection circuitry to reset. |
| | Have nearest Factory Authorized Service Agent check drive motor. |

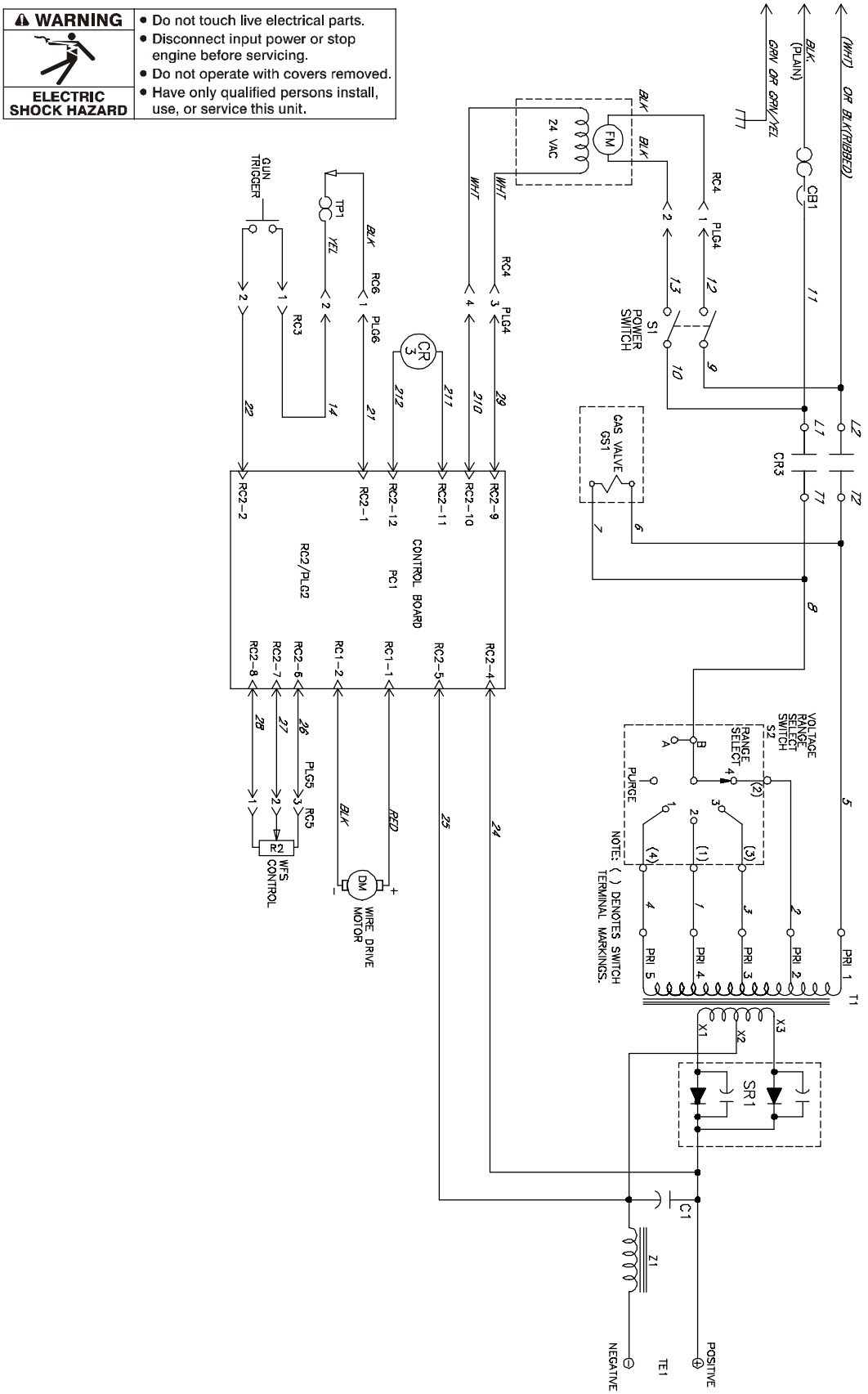
# SECTION 7 − ELECTRICAL DIAGRAM


WARNING
ELECTRIC SHOCK HAZARD
• Do not touch live electrical parts.
• Disconnect input power or stop engine before servicing.
• Do not operate with covers removed.
• Have only qualified persons install, use, or service this unit.




217 621-A

**Figure 7-1. Circuit Diagram For 115 VAC Model**




217 755-A

**Figure 7-2. Circuit Diagram For 230 VAC Model**



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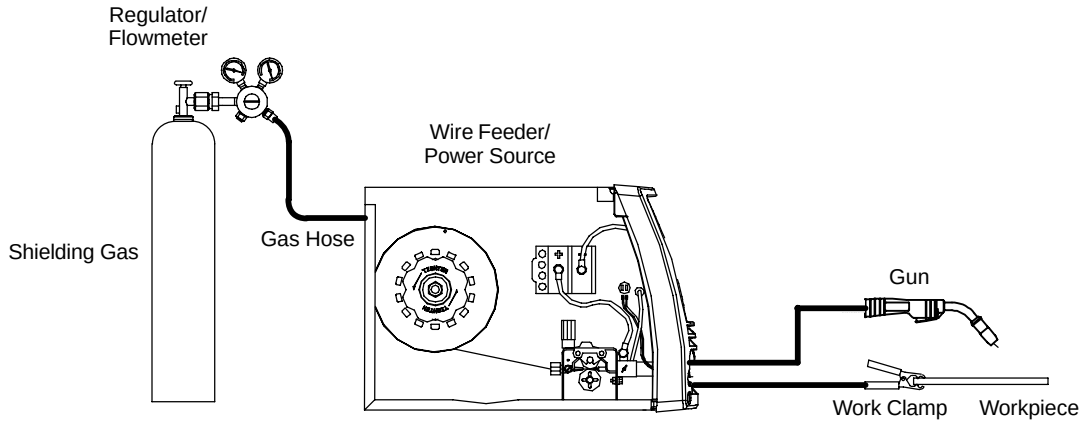
# SECTION 8 − MIG WELDING (GMAW) GUIDELINES

## 8-1. Typical MIG Process Connections

▲ **Weld current can damage electronic parts in vehicles. Disconnect both battery cables before welding on a vehicle. Place work clamp as close to the weld as possible.**



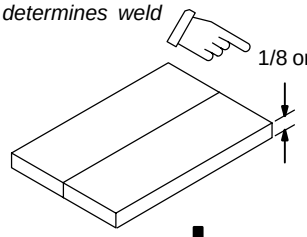

light mig 5/967 / Ref. 803 715-A

## 8-2. Typical MIG Process Control Settings

**NOTE** ☞

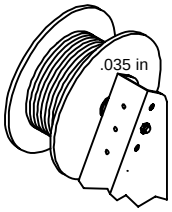
*These settings are guidelines only. Material and wire type, joint design, fitup, position, shielding gas, etc. affect settings. Test welds to be sure they comply to specifications.*

*Material thickness determines weld parameters.*




**Convert Material Thickness to Amperage (A)**

(0.001 in = 1 ampere)
0.125 in = 125 A




| Wire Size | Amperage Range |
|---|---|
| 0.023 in | 30 − 90 A |
| 0.030 in | 40 − 145 A |
| 0.035 in | 50 − 180 A |

**Select Wire Size**

| Wire Size | Recommendation | Wire Speed (Approx.) |
|---|---|---|
| 0.023 in | 3.5 in per ampere | 3.5 x 125 A = 437 ipm |
| 0.030 in | 2 in per ampere | 2 x 125 A = 250 ipm |
| 0.035 in | 1.6 in per ampere | 1.6 x 125 A = 200 ipm |

**Select Wire Speed (Amperage)**

125 A based on 1/8 in material thickness

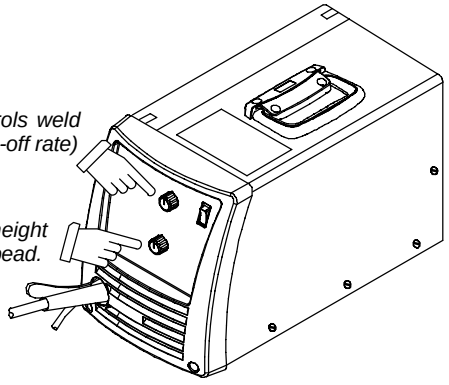
ipm = inches per minute

Low voltage: wire stubs into work
High voltage: arc is unstable (spatter)
Set voltage midway between high/low voltage

**Select Voltage**

*Wire speed (amperage) controls weld penetration (wire speed = burn-off rate)*

*Voltage controls height and width of weld bead.*

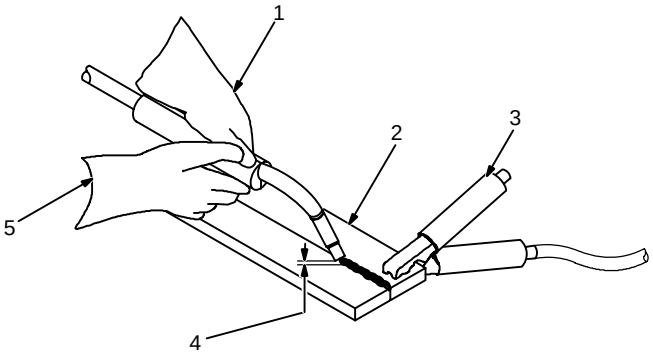


Ref. 803 710-A

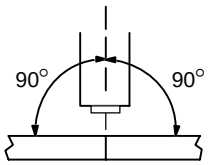
## 8-3. Holding And Positioning Welding Gun

**NOTE** ☞

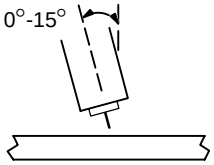
*Welding wire is energized when gun trigger is pressed. Before lowering helmet and pressing trigger, be sure wire is no more than 1/2 in (13 mm) past end of nozzle, and tip of wire is positioned correctly on seam.*




1 Hold Gun and Control Gun Trigger
2 Workpiece
3 Work Clamp
4 Electrode Extension (Stickout) 1/4 to 1/2 in (6 To 13 mm)
5 Cradle Gun and Rest Hand on Workpiece

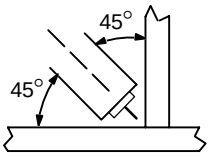



End View of Work Angle

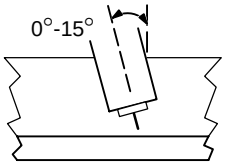



Side View of Gun Angle

GROOVE WELDS




End View of Work Angle




Side View of Gun Angle

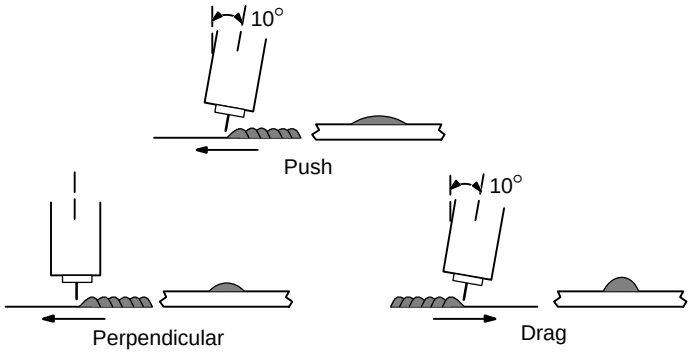
FILLET WELDS

S-0421-A

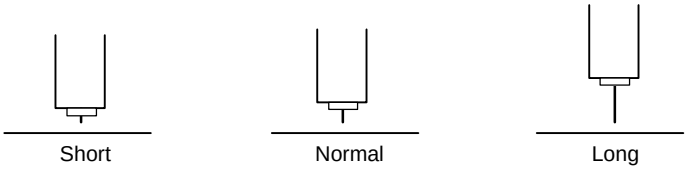
## 8-4. Conditions That Affect Weld Bead Shape

**NOTE** ☞

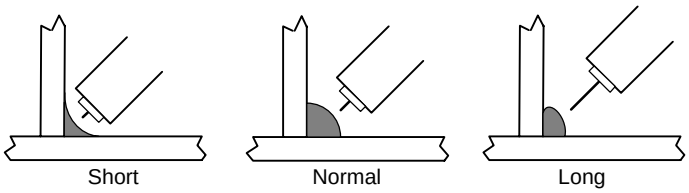
*Weld bead shape depends on gun angle, direction of travel, electrode extension (stickout), travel speed, thickness of base metal, wire feed speed (weld current), and voltage.*



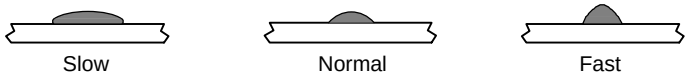

GUN ANGLES AND WELD BEAD PROFILES




ELECTRODE EXTENSIONS (STICKOUT)




FILLET WELD ELECTODE EXTENSIONS (STICKOUT)



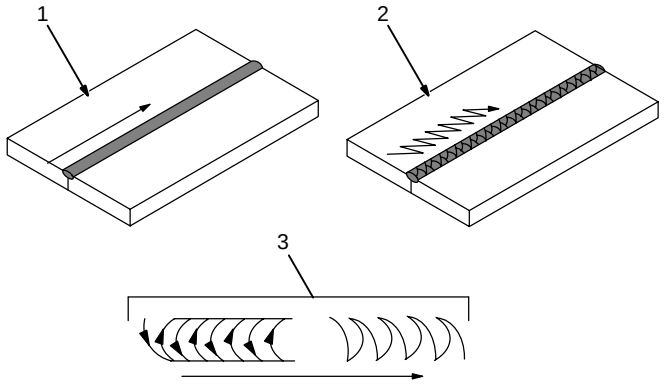

GUN TRAVEL SPEED

S-0634

## 8-5. Gun Movement During Welding

**NOTE** ☞

*Normally, a single stringer bead is satisfactory for most narrow groove weld joints; however, for wide groove weld joints or bridging across gaps, a weave bead or multiple stringer beads works better.*




1 Stringer Bead − Steady Movement Along Seam

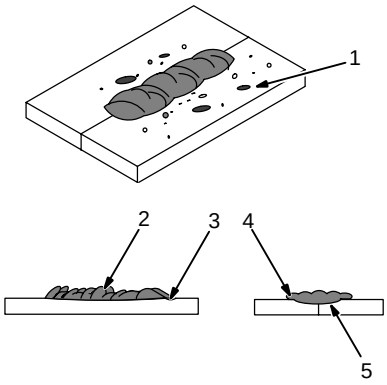
2 Weave Bead − Side To Side Movement Along Seam

3 Weave Patterns

Use weave patterns to cover a wide area in one pass of the electrode.

S-0054-A

## 8-6. Poor Weld Bead Characteristics




1 Large Spatter Deposits

2 Rough, Uneven Bead

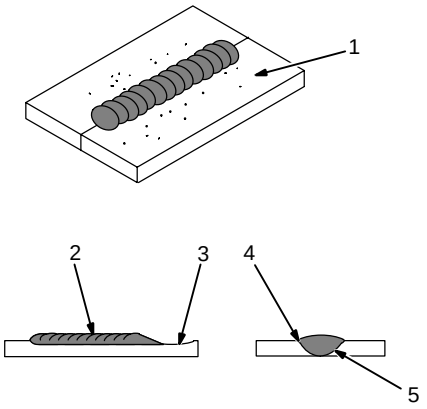
3 Slight Crater During Welding

4 Bad Overlap

5 Poor Penetration

S-0053-A

## 8-7. Good Weld Bead Characteristics




1 Fine Spatter

2 Uniform Bead

3 Moderate Crater During Welding

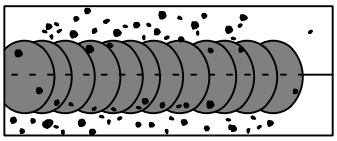
Weld a new bead or layer for each 1/8 in (3.2 mm) thickness in metals being welded.

4 No Overlap

5 Good Penetration into Base Metal

S-0052-B

## 8-8. Troubleshooting − Excessive Spatter

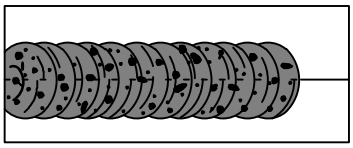


Excessive Spatter − scattering of molten metal particles that cool to solid form near weld bead.

S-0636

| Possible Causes | Corrective Actions |
|---|---|
| Wire feed speed too high. | Select lower wire feed speed. |
| Voltage too high. | Select lower voltage range. |
| Electrode extension (stickout) too long. | Use shorter electrode extension (stickout). |
| Workpiece dirty. | Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding. |
| Insufficient shielding gas at welding arc. | Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc. |
| Dirty welding wire. | Use clean, dry welding wire. |
| | Eliminate pickup of oil or lubricant on welding wire from feeder or liner. |
| Incorrect polarity. | Check polarity required by welding wire, and change to correct polarity at welding power source. |

## 8-9. Troubleshooting − Porosity

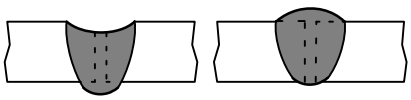


Porosity − small cavities or holes resulting from gas pockets in weld metal.

S-0635

| Possible Causes | Corrective Actions |
|---|---|
| Insufficient shielding gas at welding arc. | Increase flow of shielding gas at regulator/flowmeter and/or prevent drafts near welding arc. |
| | Remove spatter from gun nozzle. |
| | Check gas hoses for leaks. |
| | Place nozzle 1/4 to 1/2 in (6-13 mm) from workpiece. |
| | Hold gun near bead at end of weld until molten metal solidifies. |
| Wrong gas. | Use welding grade shielding gas; change to different gas. |
| Dirty welding wire. | Use clean, dry welding wire. |
| | Eliminate pick up of oil or lubricant on welding wire from feeder or liner. |
| Workpiece dirty. | Remove all grease, oil, moisture, rust, paint, coatings, and dirt from work surface before welding. |
| | Use a more highly deoxidizing welding wire (contact supplier). |
| Welding wire extends too far out of nozzle. | Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle. |

## 8-10. Troubleshooting − Excessive Penetration



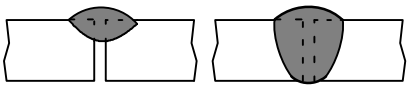
Excessive Penetration  Good Penetration

Excessive Penetration − weld metal melting through base metal and hanging underneath weld.

S-0639

| Possible Causes | Corrective Actions |
|---|---|
| Excessive heat input. | Select lower voltage range and reduce wire feed speed. |
| | Increase travel speed. |

## 8-11. Troubleshooting − Lack Of Penetration

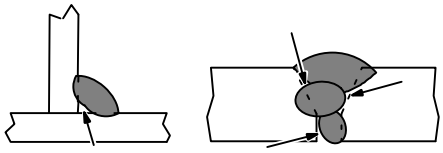



Lack Of Penetration − shallow fusion between weld metal and base metal.

S-0638

| Possible Causes | Corrective Actions |
|---|---|
| Improper joint preparation. | Material too thick. Joint preparation and design must provide access to bottom of groove while maintaining proper welding wire extension and arc characteristics. |
| Improper weld technique. | Maintain normal gun angle of 0 to 15 degrees to achieve maximum penetration. |
| | Keep arc on leading edge of weld puddle. |
| | Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle. |
| Insufficient heat input. | Select higher wire feed speed and/or select higher voltage range. |
| | Reduce travel speed. |
| Incorrect polarity. | Check polarity required by welding wire, and change to correct polarity at welding power source. |

## 8-12. Troubleshooting − Incomplete Fusion

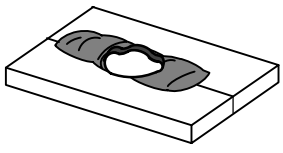


Incomplete Fusion − failure of weld metal to fuse completely with base metal or a preceeding weld bead.

S-0637

| Possible Causes | Corrective Actions |
|---|---|
| Workpiece dirty. | Remove all grease, oil, moisture, rust, paint, undercoating, and dirt from work surface before welding. |
| Insufficient heat input. | Select higher voltage range and/or adjust wire feed speed. |
| Improper welding technique. | Place stringer bead in proper location(s) at joint during welding. |
| | Adjust work angle or widen groove to access bottom during welding. |
| | Momentarily hold arc on groove side walls when using weaving technique. |
| | Keep arc on leading edge of weld puddle. |
| | Use correct gun angle of 0 to 15 degrees. |

## 8-13. Troubleshooting − Burn-Through

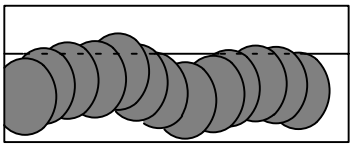


Burn-Through − weld metal melting completely through base metal resulting in holes where no metal remains.

S-0640

| Possible Causes | Corrective Actions |
|---|---|
| Excessive heat input. | Select lower voltage range and reduce wire feed speed. |
| | Increase and/or maintain steady travel speed. |

## 8-14. Troubleshooting − Waviness Of Bead

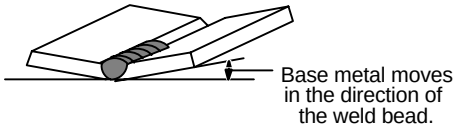


Waviness Of Bead − weld metal that is not parallel and does not cover joint formed by base metal.

S-0641

| Possible Causes | Corrective Actions |
|---|---|
| Welding wire extends too far out of nozzle. | Be sure welding wire extends not more than 1/2 in (13 mm) beyond nozzle. |
| Unsteady hand. | Support hand on solid surface or use two hands. |

## 8-15. Troubleshooting − Distortion




Distortion − contraction of weld metal during welding that forces base metal to move.

S-0642

| Possible Causes | Corrective Actions |
|---|---|
| Excessive heat input. | Use restraint (clamp) to hold base metal in position. |
| | Make tack welds along joint before starting welding operation. |
| | Select lower voltage range and/or reduce wire feed speed. |
| | Increase travel speed. |
| | Weld in small segments and allow cooling between welds. |

## 8-16. Common MIG Shielding Gases

This is a general chart for common gases and where they are used. Many different combinations (mixtures) of shielding gases have been developed over the years. The most commonly used shielding gases are listed in the following table.

| Gas | Application | | | |
|---|---|---|---|---|
| | **Spray Arc Steel** | **Short Circuiting Steel** | **Short Circuiting Stainless Steel** | **Aluminum** |
| **Argon** | | | | X |
| **Argon + 25% $CO_2$** | | X | | |
| **80% or greater Argon + balance $CO_2$ or Oxygen** | X | X[1] | | |
| **100% $CO_2$** | | X | | |
| **Tri-Mix**[2] | | | X | |

1 Limited short circuiting use

2 90% HE + 7-1/2% AR + 2-1/2% $CO_2$

## 8-17. Troubleshooting Guide For Semiautomatic Welding Equipment

| Problem | Probable Cause | Remedy |
|---|---|---|
| Wire feed motor operates, but wire does not feed. | Too little pressure on wire feed rolls. | Increase pressure setting on wire feed rolls. |
| | Incorrect wire feed rolls. | Check size stamped on wire feed rolls, replace to match wire size and type if necessary. |
| | Wire spool brake pressure too high. | Decrease brake pressure on wire spool. |
| | Restriction in the gun and/or assembly. | Check and replace cable, gun, and contact tip if damaged. Check size of contact tip and cable liner, replace if necessary. |
| Wire curling up in front of the wire feed rolls (bird nesting). | Too much pressure on wire feed rolls. | Decrease pressure setting on wire feed rolls. |
| | Incorrect cable liner or gun contact tip size. | Check size of contact tip and check cable liner length and diameter, replace if necessary. |
| | Gun end not inserted into drive housing properly. | Loosen gun securing bolt in drive housing and push gun end into housing just enough so it does not touch wire feed rolls. |
| | Dirty or damaged (kinked) liner. | Replace liner. |
| Wire feeds, but no gas flows. | Gas cylinder empty. | Replace empty gas cylinder. |
| | Gas nozzle plugged. | Clean or replace gas nozzle. |
| | Gas cylinder valve not open or flowmeter not adjusted. | Open gas valve at cylinder and adjust flow rate. |
| | Restriction in gas line. | Check gas hose between flowmeter and wire feeder, and gas hose in gun and cable assembly. |
| | Loose or broken wires to gas solenoid. | Have Factory Authorized Service Agent repair wiring. |
| | Gas solenoid valve not operating. | Have Factory Authorized Service Agent replace gas solenoid valve. |
| | Incorrect primary voltage connected to welding power source. | Check primary voltage and relink welding power source for correct voltage. |

| Problem | Probable Cause | Remedy |
|---|---|---|
| Welding arc not stable. | Wire slipping in drive rolls. | Adjust pressure setting on wire feed rolls. Replace worn drive rolls if necessary. |
| | Wrong size gun liner or contact tip. | Match liner and contact tip to wire size and type. |
| | Incorrect voltage setting for selected wire feed speed on welding power source. | Readjust welding parameters. |
| | Loose connections at the gun weld cable or work cable. | Check and tighten all connections. |
| | Gun in poor shape or loose connection inside gun. | Repair or replace gun as necessary. |

# Notes

# SECTION 9 − PARTS LIST

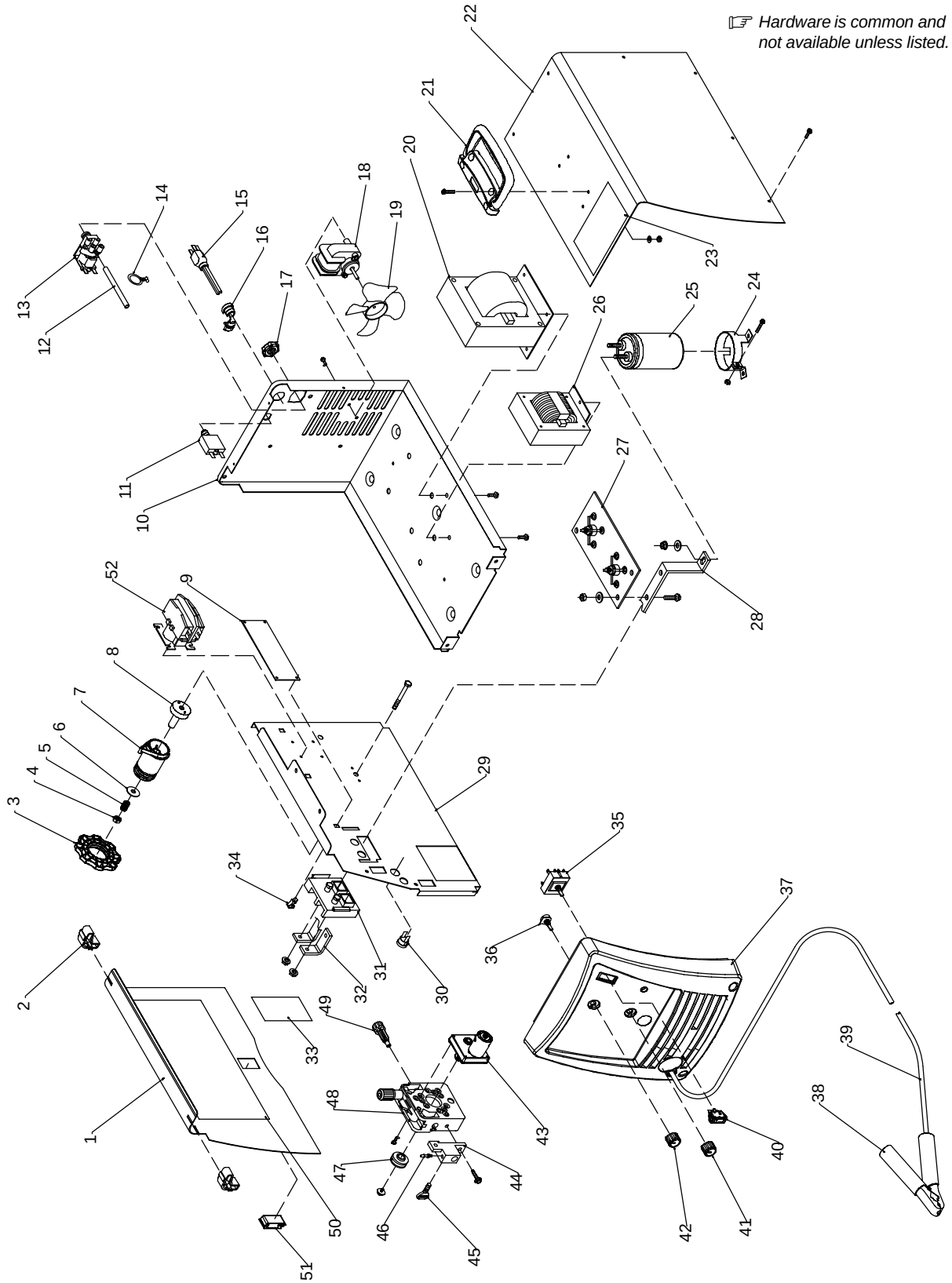



**Figure 9-1. Main Assembly**

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 9-1. Main Assembly**

| | | | | |
|---|---|---|---|---|
| 1 | | 199 566 | DOOR, access | 1 |
| 2 | | 196 006 | HINGE, door | 2 |
| 3 | | 211 887 | HUB, nut | 1 |
| 4 | | 204 608 | NUT | 1 |
| 5 | | 202 998 | SPRING, cprsn | 1 |
| 6 | | 203 072 | WASHER, flat | 1 |
| 7 | | 211 339 | HUB, spool | 1 |
| 8 | | 202 726 | ADAPTER, spool hub | 1 |
| 9 | | 217 072 | CIRCUIT CARD ASSY, control (115 VAC model) | 1 |
| 9 | | 217 078 | CIRCUIT CARD ASSY, control (230 VAC model) | 1 |
| 10 | | 195 999 | BASE, lower | 1 |
| 11 | | 210 109 | CIRCUIT BREAKER, 25 amp | 1 |
| 12 | | 196 467 | TUBING, PVC .187 ID x .312 OD x 24.000 | 1 |
| 13 | | 216 397 | VALVE, gas (115 VAC model) | 1 |
| 13 | | 216 398 | VALVE, gas (230 VAC model) | 1 |
| 14 | | 197 198 | CABLE TIE, .700-.799 bundle dia | 2 |
| **15** | | **147 545** | **CORD SET, 125V 5−15P 14GA 3/C 7ft SPT−3 jkt (115 VAC model)** | **1** |
| **15** | | **152 118** | **CORD SET, 250V 6−50P 12GA 3/C 7ft SPT−3 jkt (230 VAC model)** | **1** |
| 16 | | 111 443 | BUSHING, strain relief | 1 |
| 17 | | 137 761 | NUT, gas valve | 1 |
| 18 | | 196 063 | MOTOR, fan (115 VAC model) | 1 |
| 18 | | 196 064 | MOTOR, fan (230 VAC model) | 1 |
| 19 | | 409 953-001 | BLADE, fan cooling | 1 |
| 20 | | 217 096 | TRANSFORMER, power assy (115 VAC model) | 1 |
| 20 | | 217 389 | TRANSFORMER, power assy (230 VAC model) | 1 |
| 21 | | 208 015 | HANDLE, carrying | 1 |
| 22 | | 196 005 | WRAPPER | 1 |
| 23 | | 204 036 | LABEL, warning | 1 |
| 24 | | 203 491 | CLAMP, capacitor | 1 |
| 25 | | 193 039 | CAPACITOR, electlt 53000uf (115 VAC model) | 1 |
| 25 | | 193 040 | CAPACITOR, electrlt 100000uf (230 VAC model) | 1 |
| 26 | | 203 868 | REACTOR ASSY (115 VAC model) | 1 |
| 26 | | 203 874 | REACTOR ASSY (230 VAC model) | 1 |
| 27 | | 193 191 | RECTIFIER ASSY (115 VAC model) | 1 |
| 27 | | 193 316 | RECTIFIER ASSY (230 VAC model) | 1 |
| 28 | | 193 193 | BUS BAR (positive) | 1 |
| 29 | | 217 831 | BAFFLE, center | 1 |
| 30 | | 405 576-001 | BUSHING, terminal | 1 |
| 31 | | 193 144 | INSULATOR, output stud | 1 |
| 32 | | 193 194 | BUS BAR (negative) | 1 |
| 33 | | 199 824 | LABEL, warning | 1 |
| 34 | | 134 201 | STAND-OFF | 1 |
| 35 | | 409 477 | SWITCH, rotary 25A 5 position | 1 |
| 36 | | 209 873 | POTENTIOMETER, | 1 |
| 37 | | 217 062 | PANEL, front (purple) | 1 |
| 37 | | 214 739 | PANEL, front (black) | 1 |
| 38 | | 010368 | CLAMP, work | 1 |
| 39 | | 196 619 | CABLE, work | 1 |
| 40 | | 196 575 | SWITCH, rocker SPST (115 VAC model) | 1 |

| Item No. | Dia. Mkgs. | Part No. | Description | Quantity |
|---|---|---|---|---|

**Figure 9-1. Main Assembly (Continued)**

| | | | | |
|---|---|---|---|---|
| . . . 40 | 196 574 | . . | SWITCH, rocker DPST (230 VAC model) | 1 |
| . . . 41 | 207 079 | . . | KNOB, pointer (voltage) | 1 |
| . . . 42 | 211 338 | . . | KNOB, pointer (WFS) | 1 |
| . . . 43 | 217 778 | . . | MOTOR, gear | 1 |
| . . . 44 | 193 189 | . . | CONNECTOR, gun | 1 |
| . . . 45 | 196 654 | . . | SCREW, thumb | 1 |
| . . . 46 | 196 009 | . . | FITTING, gas barbed | 1 |
| . . . 47 | 202 925 | . . | ROLL, feed .024 in, .030/.035 in | 1 |
| . . . 48 | 194 508 | . . | HEAD, feed assy | 1 |
| . . . 49 | 203 025 | . . | GUIDE, wire inlet | 1 |
| . . . 50 | 217 618 | . . | LABEL, weld chart (115 VAC model) | 1 |
| . . . 50 | 217 754 | . . | LABEL, weld chart (230 VAC model) | 1 |
| . . . 51 | 204 711 | . . | LATCH | 1 |
| . . . 52 | 217 584 | . . | CONTACTOR (115 VAC model) | 1 |
| . . . 52 | 217 585 | . . | CONTACTOR (230 VAC model) | 1 |

+When ordering a component originally displaying a precautionary label, the label should also be ordered.

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

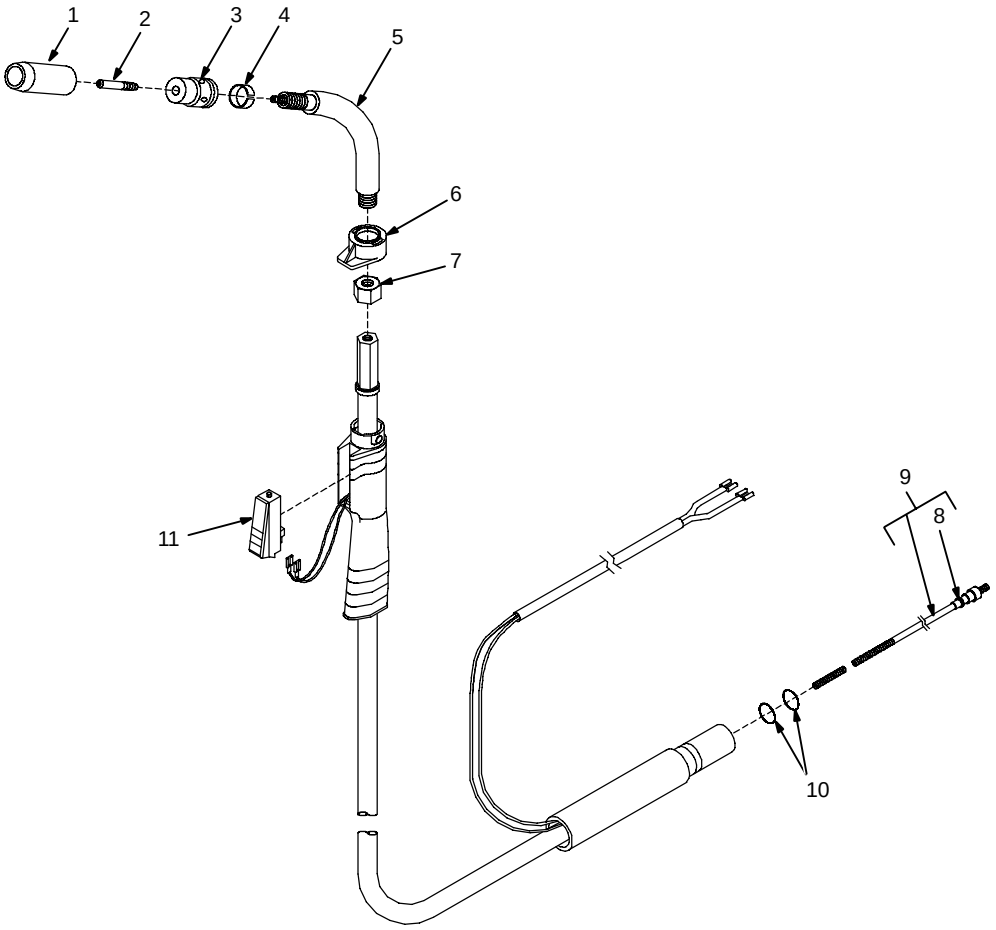



**Figure 9-2. H-10 Gun**

| Item No. | Part No. | Description | Quantity |
|---|---|---|---|
| | **195 957** | **Figure 9-2. H-10 Gun** | |
| 1 | 169 715 | NOZZLE, slip type .500 orf flush | 1 |
| 2 | ♦087 299 | TIP, contact scr .023 wire x 1.125 | |
| 2 | ♦000 067 | TIP, contact scr .030 wire x 1.125 | |
| 2 | ♦000 068 | TIP, contact scr .035 wire x 1.125 | |
| 2 | ♦000 069 | TIP, contact scr .045 wire x 1.125 | |
| 3 | 169 716 | ADAPTER, contact tip | 1 |
| 4 | 170 470 | RING, retaining | 1 |
| 5 | 169 718 | TUBE, head | 1 |
| 6 | 169 738 | NUT, locking handle | 1 |
| 7 | 169 719 | NUT, jam | 1 |
| 8 | 079 975 | O-RING, .187 ID x .103CS rbr | 1 |
| 9 | ♦194 010 | LINER, monocoil .023/.025 wire x 15ft (consisting of) | 1 |
| 9 | ♦194 011 | LINER, monocoil .030/.035 wire x 15ft (consisting of) | 1 |
| 9 | ♦194 012 | LINER, monocoil .035/.045 wire x 15ft (consisting of) | 1 |
| 9 | ♦194 014 | LINER, monocoil 4/64 AL wire x 10ft nyl(consisting of) | 1 |
| 10 | 197 123 | O-RING, .312 ID x .062 70 Dura BUNA-N | 2 |
| 11 | 196 255 | SWITCH, trigger | 1 |

♦OPTIONAL

**To maintain the factory original performance of your equipment, use only Manufacturer's Suggested Replacement Parts. Model and serial number required when ordering parts from your local distributor.**

## 9-3. Optional Drive Rolls

| For All Feed Head Assemblies | |
|---|---|
| **PART NO.** | **WIRE DIAMETER INCHES (mm)** |
| 202 925 | .023/.025 (.6) and .030/.035 (.8 and .9) |
| 202 926 | .030/.035 (.8 and .9) and .045 (1.2 VK Groove) |

## 9-4. Options

| PART NO. | DESCRIPTION | REMARKS |
|---|---|---|
| 770 187 | Running Gear/Cylinder Rack | For One Small Gas Cylinder, 100 lb (45 kg) max. |
| 194 776 | Small Running Gear/Cylinder Rack | For One Small Gas Cylinder, 75 lb (34 kg) max. |
| 195 957 | H-10 Replacement Gun | 10 ft length/.030-.035 wire size |
| 195 186 | Protective Cover | Weatherproof nylon |
| 212 492 | Regulator/Flowmeter | For use with $CO_2$ shielding gas, 10−50 CFH |

NOTE: If individual parts are required, see Parts List chapter of this manual for part number to order.

# Notes

# Warranty

## Effective January 1, 2003
## (Equipment with a serial number preface of “LC” or newer)

This limited warranty supersedes all previous manufacturers warranties and is exclusive with no other guarantees or warranties expressed or implied.

LIMITED WARRANTY − Subject to the terms and conditions below, warrants to its original retail purchaser that new equipment sold after the effective date of this limited warranty is free of defects in material and workmanship at the time it is shipped from factory. THIS WARRANTY IS EXPRESSLY IN LIEU OF ALL OTHER WARRANTIES, EXPRESS OR IMPLIED, INCLUDING THE WARRANTIES OF MERCHANTABILITY AND FITNESS.

Within the warranty periods listed below, manufacturer will repair or replace any warranted parts or components that fail due to such defects in material or workmanship. Manufacturer must be notified in writing within thirty (30) days of such defect or failure, at which time manufacturer will provide instructions on the warranty claim procedures to be followed.

Manufacturer shall honor warranty claims on warranted equipment listed below in the event of such a failure within the warranty time periods. All warranty time periods start on the date that the equipment was delivered to the original retail purchaser, or one year after the equipment is sent to the distributor.

1. 5 Years Parts — 3 Years Labor
   * Original main power rectifiers
2. 3 Years — Parts and Labor
   * Transformer/Rectifier Power Sources
   * Plasma Arc Cutting Power Sources
   * Semi-Automatic and Automatic Wire Feeders
   * Engine Driven Welding Generators
     **(NOTE: Engines are warranted separately by the engine manufacturer.)**
3. 1 Year — Parts and Labor Unless Specified
   * DS-2 Wire Feeder
   * Motor Driven Guns (w/exception of Spoolmate Spoolguns)
   * Process Controllers
   * Positioners and Controllers
   * Automatic Motion Devices
   * RFCS Foot Controls
   * Induction Heating Power Sources
   * Water Coolant Systems
   * Flowgauge and Flowmeter Regulators (No Labor)
   * HF Units
   * Grids
   * Spot Welders
   * Load Banks
   * Running Gear/Trailers
   * Field Options
     (NOTE: Field options are covered for the remaining warranty period of the product they are installed in, or for a minimum of one year — whichever is greater.)
4. 6 Months — Batteries
5. 90 Days — Parts and Labor
   * MIG Guns/TIG Torches
   * Induction Heating Coils and Blankets
   * Plasma Cutting Torches
   * Remote Controls
   * Accessory Kits
   * Replacement Parts
   * Spoolmate Spoolguns
   * Canvas Covers

Limited Warranty shall not apply to:

1. **Consumable components; such as contact tips, cutting nozzles, contactors, relays, brushes, slip rings, or parts that fail due to normal wear.**
2. Items furnished by manufacturer, but manufactured by others, such as engines or trade accessories. These items are covered by the manufacturer’s warranty, if any.
3. Equipment that has been modified by any party other than manufacturer, or equipment that has been improperly installed, improperly operated or misused based upon industry standards, or equipment which has not had reasonable and necessary maintenance, or equipment which has been used for operation outside of the specifications for the equipment.

MANUFACTURER’S PRODUCTS ARE INTENDED FOR PURCHASE AND USE BY COMMERCIAL/INDUSTRIAL USERS AND PERSONS TRAINED AND EXPERIENCED IN THE USE AND MAINTENANCE OF WELDING EQUIPMENT.

In the event of a warranty claim covered by this warranty, the exclusive remedies shall be, at manufacturers option: (1) repair; or (2) replacement; or, where authorized in writing by manufacturer in appropriate cases, (3) the reasonable cost of repair or replacement at an authorized service station; or (4) payment of or credit for the purchase price (less reasonable depreciation based upon actual use) upon return of the goods at customer’s risk and expense. manufacturer’s option of repair or replacement will be F.O.B., Factory at Appleton, Wisconsin, or F.O.B. at an authorized service facility as determined by manufacturer. Therefore no compensation or reimbursement for transportation costs of any kind will be allowed.

TO THE EXTENT PERMITTED BY LAW, THE REMEDIES PROVIDED HEREIN ARE THE SOLE AND EXCLUSIVE REMEDIES. IN NO EVENT SHALL MANUFACTURER BE LIABLE FOR DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES (INCLUDING LOSS OF PROFIT), WHETHER BASED ON CONTRACT, TORT OR ANY OTHER LEGAL THEORY.

ANY EXPRESS WARRANTY NOT PROVIDED HEREIN AND ANY IMPLIED WARRANTY, GUARANTY OR REPRESENTATION AS TO PERFORMANCE, AND ANY REMEDY FOR BREACH OF CONTRACT TORT OR ANY OTHER LEGAL THEORY WHICH, BUT FOR THIS PROVISION, MIGHT ARISE BY IMPLICATION, OPERATION OF LAW, CUSTOM OF TRADE OR COURSE OF DEALING, INCLUDING ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR PARTICULAR PURPOSE, WITH RESPECT TO ANY AND ALL EQUIPMENT FURNISHED BY MANUFACTURER IS EXCLUDED AND DISCLAIMED BY MANUFACTURER.

Some states in the U.S.A. do not allow limitations of how long an implied warranty lasts, or the exclusion of incidental, indirect, special or consequential damages, so the above limitation or exclusion may not apply to you. This warranty provides specific legal rights, and other rights may be available, but may vary from state to state.

In Canada, legislation in some provinces provides for certain additional warranties or remedies other than as stated herein, and to the extent that they may not be waived, the limitations and exclusions set out above may not apply. This Limited Warranty provides specific legal rights, and other rights may be available, but may vary from province to province.

# Owner's Record

Please complete and retain with your personal records.

Model Name Serial/Style Number

Purchase Date (Date which equipment was delivered to original customer.)

Distributor

Address

City

State Zip

# Resources Available

Always provide Model Name and Serial/Style Number.

| | |
|---|---|
| Contact your Distributor for: | Welding Supplies and Consumables |
| | Options and Accessories |
| | Personal Safety Equipment |
| | Service and Repair |
| | Replacement Parts |
| | Owner's Manuals |
| | Circuit Diagrams |
| Contact the Delivering Carrier to: | File a claim for loss or damage during shipment. |
| | For assistance in filing or settling claims, contact your distributor and/or equipment manufacturer's Transportation Department. |

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